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THE UNIVERSITY OF ALBERTA

A SUPPORTIVE-EDUCATIVE TELEPHONE PROGRAM: IMPACT ON KNOWLEDGE AND ANXIETY AFTER CORONARY ARTERY BYPASS GRAFT SURGERY

BY

THERESA BECKIE

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF NURSING

FACULTY OF NURSING

EDMONTON, ALBERTA

FALL, 1987

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THE UNIVERSITY OF ALBERTA

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled A supportive-Educative telephone program: Impact on Knowledge and Anxiety After Coronary Artery Bypass Graft Surgery submitted by Theresa Beckie in partial fulfillment of the requirements for the degree of Master of Nursing.

Phyllis Gennaro
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Stacey Levine

G Worley

Date: October 8, 1987

This manuscript is dedicated to my parents,

Margaret Ann and Lawrence Beckie

for their endless love and prayers.

ABSTRACT

The purpose of this study was to investigate the impact of a supportive-educative telephone program on the levels of knowledge and anxiety of coronary artery bypass graft (CABG) surgical patients during the first 6 weeks following hospital discharge. Utilizing a posttest only control group experimental design, the first 74 patients scheduled, between September 1986 and February 1987, for CABG surgery in a large, western Canadian, teaching hospital, were randomly assigned to either an experimental or control group. The effect of the intervention, which was implemented by a Cardiac Rehabilitation Nurse Specialist, was assessed utilizing a knowledge test developed by Horn and Swain (1977). The S-Anxiety Inventory developed by Spielberger, Gorsuch, and Lushene (1983) was administered to measure state anxiety. Utilizing these instruments, data were collected by the principal investigator, blind to the participants group assignment, during posttest interviews 6 weeks after hospital discharge. It was hypothesized that by providing supportive counseling and rehabilitative education, participant anxiety would decrease and knowledge would increase in the areas of: (a) coronary artery disease, its effects and related self-care measures; (b) therapeutic diet; (c) prescribed medications; (d) recommended physical activity restrictions; (e) recommended exercises; and (f) recommended rest.

Data analysis with independent t-tests revealed a statistically significant ($p < .05$) difference between the knowledge level of the experimental group and control group in the areas of coronary artery disease, its effects and related self-care measures, therapeutic diet, prescribed medications, recommended physical activity restrictions, recommended exercises, and recommended rest. A statistically significant difference between the S-Anxiety level of the experimental and the control group was also evident as was a statistically significant inverse relationship between participants' knowledge and anxiety levels.

The findings of this study suggest that the supportive-educative telephone program effectively increases knowledge and decreases anxiety of selected CABG surgical patients in the home convalescent period. Further, there appears to be an inverse relationship between CABG surgical patients' level of knowledge and level of anxiety. From these findings, several implications and recommendations for nursing practice, administration, education, and research have been generated.

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CHAPTER I

Introduction

Background of The Problem

Coronary artery disease (CAD) ranks as the leading cause of death in Canada (Wielgosa, 1985). Despite the decline in CAD mortality in recent decades, 27,552 males and 19,855 females died of CAD in Canada in 1985 (Statistics Canada, 1986). The principle clinical manifestations of CAD are sudden death, myocardial infarction (MI), angina pectoris, and chronic congestive heart failure (Braunwald, 1985; Cohn, 1985). Coronary artery bypass graft (CABG) surgery, first introduced in 1967 (Favaloro, 1969; Favaloro, Effler, & Girores, 1970), has become the mainstay of palliative treatment for extensive CAD (CASS, 1983a, 1983b; McCauley, Brest, & McGoon, 1985; Callaghan, 1986; Cooley, 1987). However, the considerable attention devoted to the technical aspects of CABG surgery overwhelmingly surpasses the attention devoted to the psychological and social ramifications of this surgery.

The most important benefit of this surgical procedure is the reduction in the frequency and severity of anginal pain (Bourassa et al., 1985; Campeau, 1986). Pain, previously refractory to medical management, is reduced in 80% to 96% of surgical patients (Braunwald, 1983; Bass, 1984; Collins, Cohn, & Shemin, 1985; Cooley, 1987). "The relief of angina after CABG is prompt, dramatic, and complete in most patients" (Callaghan, 1986, p. 46). In contrast, substantial relief of

angina with medical therapy occurs in only 25% of patients (Connor & Bristow, 1985).

In 1974 in Canada, 2,462 patients underwent CABG surgery (Statistics Canada, 1977). This number had increased to 7,175 by 1980 (Statistics Canada, 1984) and to 13,218 by 1983 (Statistics Canada, 1987). Thus, CABG surgery presently represents a large number of the total surgical procedures performed in many hospitals. With appropriate selection of CABG surgical patients, a level of physical functioning previously unattainable may now be achieved through surgical intervention. However, from the psychosocial viewpoint, it is no panacea. For many patients after successful CABG surgery, the quality of their lives is less than optimal. Although CABG surgery has been the subject of several quality of life studies, most of the published work have concentrated on return to work and relief of symptoms as the primary determinants of successful patient rehabilitation (Walter, 1985; Oberman, 1984; Carr & Powers, 1986).

The variable most often equated with successful rehabilitation after CABG surgery is the return to gainful employment. The ease of measurement and objectivity of this variable are underscored by the large number of studies that have focused on employment status. However, the various reports generally provide data for nonequivalent groups and for disparate time intervals. Comparisons between studies are further complicated by the presence of uncontrolled variables which might reasonably be expected to influence employment.

Nonetheless, the literature clearly indicates that the reintegration of patients into their social sphere has not been accomplished to the extent that might be expected after CABG surgery. Numerous reports world wide describe a decrease of from 17% to 95% in the employment of patients who were working before CABG surgery (Walter, 1985). Despite their substantial symptomatic and functional improvement fewer patients return to work after CABG surgery than following an uncomplicated MI (Wenger, Mattson, Furberg, & Elinson, 1984). Although researchers have explored a number of variables thought to influence postoperative work status, few have provided insight into the means for development of effective psycho-educational interventions aimed at limiting the disruptive effect of CABG surgery on the patient's psychosocial well-being.

Researchers have explained the low rates of return to work on the basis of cultural background (Oberman & Finklea, 1982; Oberman et al., 1985), age (Rimm, Barboriak, Anderson, & Simon, 1976; Rosenfeldt, Lambert, Burrows, & Stirling, 1983; Rothlin, Sieber & Senning, 1985), education (Westaby, Sapsford, & Bentall, 1979; Croog & Levine, 1979), psychological factors (Zyzanski, Rouse, Stanton, & Jenkins, 1982; Kinchla & Weiss, 1985), and patient/doctor and patient/employer relationships (Liddle, Jensen, & Clayton, 1981). A large proportion of patients also describe constricted social lives, low self-esteem, anxiety, and lack of pleasure from close relationships after surgery (Kinchla &

Weiss, 1985). Therefore, correcting the impoverished coronary circulation and decreasing angina does not necessarily improve the individual's sense of well-being.

Since heart surgery was first performed in the early 1950s, the incidence of postoperative emotional reactions and long-term readjustment problems has been noted to be greater and perhaps different in kind from responses to other types of surgery or illnesses. One of the most common emotional reactions to MI and myocardial revascularization is anxiety (Kappagoda, 1984; Gilliss, 1984; Blumenthal, 1985; Radley & Green, 1985; Hackett & Cassem, 1984; Wiklund, Sanne, Anders, & Wilhemsson, 1985). The literature indicates that high levels of anxiety commonly occur both before as well as after surgery accompanied by cognitive deficits that make retention of information difficult (Sanderson, 1983). More specifically, there is considerable evidence that the immediate home convalescent period is particularly anxiety provoking for many CABG surgical patients and their families (Boisvert, 1976; Gilliss, 1984; Ramshaw & Stanley, 1981; Jenkins, Stanton, Savageau, Denlinger, & Klein, 1983; Gortner, Gilliss, Moran, Sparacino, & Kenneth, 1985).

CABG surgical patients' anxiety frequently results from fear of death, threat of complications, concern with the significance of various somatic symptoms, and fear of being abandoned and isolated (Blumenthal, 1985). There is agreement that the effects of anxiety are generally maladaptive and debilitating rather than adaptive and facilitating. However,

there is a lack of general consensus on specific aspects of the nature of anxiety and on specific aspects of the relation of anxiety to a broad spectrum of behavioral indices.

Spielberger (1976) distinquishes between a transitory emotional state called state anxiety (S-Anxiety) and a relatively stable anxiety proneness called trait anxiety (T-Anxiety). State anxiety is evoked whenever individuals perceive particular stimuli or situations as potentially harmful, dangerous, or threatening to them. Thus if patients perceive CABG surgery as threatening, regardless of objective danger, they will respond with an elevation in state anxiety. Fear of death and perceived threats to financial security, family integrity, and life style are predictable reactions that contribute to the state anxiety of CABG surgical patients (Heller & Kornfeld, 1986). Trait anxiety refers to individual differences in anxiety proneness as a personality trait. Persons high in trait anxiety exhibit elevations in state anxiety more frequently than do individuals who are low in trait anxiety because they tend to perceive and react to a wider range of situations as dangerous or threatening.

The complex relationship between anxiety and learning in CABG surgical patients is an important issue to health care providers. Researchers suggest that knowledge retention is limited during the acute phase of illness (Curran, 1978; Finkbeiner, 1979; Newby, 1980; Tirrell & Hart, 1980; Marshall, Penckofer, & Llewellyn, 1986) owing to the inhibitory effects of state anxiety on learning (Reading, 1981; Spielberger,

1972). The acute in-hospital phase of illness presents a number of factors contributing to the state anxiety of the CABG surgical patient and in turn hinders the learning process. First, the unfamiliar environment of the institutional setting as well as the complexities of technology can be overwhelming. Additional factors thought to contribute to CABG surgical patients' anxiety and subsequent inability to learn during recovery in hospital include the hospital's daily routine, lack of trust and rapport, physical condition, lack of motivation, and patients' concerns for survival (Wenger, 1986; Wise, 1979). The limited knowledge retention during the brief hospitalization after CABG surgery and the patients' inability to anticipate which problems will be faced upon return to the home environment accentuate the anxiety experienced in the early home convalescent period.

The first weeks after discharge are thought to represent a period when patients are not only anxious but also have frequent questions and concerns (Nicklin, 1986; Murray & Beller, 1983). Indeed, many concerns become apparent only when CABG surgical patients return home; their need to know the means by which to alter their lives and make the necessary changes becomes more immediate. Scalzi, Burke, and Greenland (1980) and Gilliss (1984) advocate the reinforcement of knowledge during the early home convalescent period when patients are more receptive to instruction thereby improving self-care knowledge and compliance. Thus it would seem more prudent to concentrate on the patients' concerns in the early

home convalescent period than to force feed information in hospital when patients' overriding concerns relate to survival. Cardiac rehabilitation experts (Kappagoda, 1984; Stern, 1984) recommend both education and supportive counseling in the immediate home convalescent period to alleviate anxiety and apprehension in the cardiac patient.

Cardiac rehabilitation is a comprehensive process through which patients with CAD are restored to and maintained at their optimal medical, physical, emotional, vocational, and social levels of performance (Naughton, 1984; Peterson, 1983). Patient and family education, progressive ambulation, and psychosocial support and counseling are generally included in cardiac rehabilitation programs (Yee & Zorb, 1986; Wilson-Barnett, 1983). Mayou (1986) and others (Goldman & Kimball, 1985; Oldridge, 1986) contend that knowledge about CAD and its treatment, clarification of misconceptions, preparation for the emotional reactions to CAD and CABG surgery, and early planning for resumption of daily activities can reduce anxiety, thus, facilitating coping and promoting a favorable recovery.

Cardiac rehabilitation programs vary widely in scope, intent, and delivery of services due to problems of finding qualified personnel, cost, and lack of research regarding effectiveness of existing methods and programs (Yee & Zorb, 1986; Peterson, 1983). The most common structure for rehabilitation services for CAD patients has been in the form of associations with established medical or academic

institutions (Dehn & Mullins, 1984). Most rehabilitation programs begin 6 weeks after surgery which leads to a disruption in the continuity of the instructional process.

During the period between in-hospital and outpatient structured informational programs, patients often formulate their own concepts about CAD. An incomplete or misconstrued knowledge base may lead to bizarre and frightening concepts and subsequent high anxiety (Falvo, 1985; Cohen, 1981). Anxiety and depression have been identified as the major psychological hurdles in rehabilitation of the CAD patient (Wenger, 1986). Further, each can lead to unwarranted invalidism resulting in anquish for the individual as well as the family members. Doehrman (1977) emphasizes the need for more attention to the patients' manifestations of anxiety in the post-hospital period as the emotional distress of most patients reaches a peak after hospital discharge during convalescence at home.

Psychological and information factors ought to be considered in tailoring and evaluating programs designed to convey rehabilitation information to the cardiac patient (Tilly, Gregor, & Thiessen, 1987). There are few published controlled trials of cardiac rehabilitation patient education interventions; as well, the results are conflicting (Devine & Cook, 1986). Researchers evaluating patient education often work without unifying concepts and fail to use experimental research methodologies or reliable and valid data collection tools. Several researchers found that patients gained

knowledge of their condition and medical regimen in outpatient rehabilitation programs (Rosenburg, 1971; Raviaro, Holmes, & Holmsten, 1984). However, other investigators concluded that selected rehabilitation programs failed to improve the participants' understanding of their illness, activities of everyday life, or psychological status (Bengtsson, 1983; Stern & Cleary, 1982; Horlick, Cameron, Firor, Bhalerao, & Baltzan, 1984; O'Connor, 1983). Thus, the educational benefits of participation in traditional cardiac rehabilition programs are questionable.

Statement of The Problem

The current abbreviated hospital stay after CABG surgery has considerably limited the ability to provide the information and support that patients need to prepare for convalescence and recovery (Wenger, 1986). Prior to the CABG surgical patient's discharge from hospital, it is impossible to anticipate all the problems they might experience in the early home convalescent period; problems which frequently require professional advice (Nicklin, 1986). According to Marshall (1985), the nurse as a member of the interdisciplinary cardiac rehabilitation team, is best able to meet the educational and supportive counseling needs of the CABG surgical patient and the family. Nurses involved in cardiac rehabilitation programs have become increasingly sophisticated in using creative teaching/learning strategies to help clients attain and maintain healthy life styles (Hill & Smith, 1985).

A recent innovative approach to cardiac rehabilitation patient education has been identified; the procedure of having a nurse telephone the patient on a regular basis in the early home convalescent period (Hackett & Cassem, 1984; Stevens, 1985). This approach to patient education is conceived and designed to help patients cope with their unique, individual learning needs. The supportive-educative telephone program is more likely to improve the course of chronic CAD than is a standard presentation of medical facts and treatment rules which all heart diseased patients ought to know. Although nurses consistently act as patient educators, there exists a need to critically evaluate the effectiveness of this role in terms of patient outcomes (Syred, 1981).

According to Friedman, Furberg, and Demets (1985), a controlled clinical trial is the most definitive method of determining whether an intervention has the postulated effect. There is a need to scientifically examine the effectiveness of educational and counseling cardiac rehabilitation programs through controlled clinical observation. A supportive-educative telephone program may be one important and effective means of identifying learning needs, providing self-care education and supportive, emotional care to CABG surgical patients. Nursing research, such as this clinical study, is essential for a sound, empirically based body of knowledge foundational to nursing practice.

Statement of The Purpose

The purpose of this prospective study was to gain knowledge and understanding of the effectiveness of a nursing approach to patient teaching and counseling which places primary emphasis on the participant's ability to regain and maintain health during the first 6 to 7 weeks following CABG surgery.

Research Objectives

The specific research objectives were:

1. To evaluate the effects of a supportive-educative telephone program on the CABG surgical patients' levels of knowledge in the areas of:
   a) health deviation (CAD), its effect and related self-care measures,
   b) diet,
   c) medications,
   d) physical activity restrictions,
   e) exercises, and,
   f) rest.
2. To evaluate the effects of a supportive-educative telephone program on CABG surgical patients' levels of anxiety; and
3. To determine the relationship between CABG surgical patients' levels of knowledge and anxiety.

Hypotheses

The following hypotheses were formulated:

When compared with CABG surgical patients who receive routine health care during the home convalescent phase, CABG surgical patients who are exposed to a supportive-educative telephone program during this same time period will demonstrate:

H1 greater levels of knowledge about CAD, its effect and related self-care measures;

H2 greater levels of knowledge about therapeutic diet;

H3 greater levels of knowledge about prescribed medications;

H4 greater levels of knowledge about recommended physical activity restrictions;

H5 greater levels of knowledge about recommended exercises;

H6 greater levels of knowledge about recommended rest;

H7 lower levels of state anxiety; and,

H8 CABG surgical patients' levels of anxiety will correlate inversely with their levels of knowledge.

Operational Definitions

Coronary Artery Bypass Graft Surgery. An operative procedure whereby an autogenous vein segment (saphenous vein, cephalic vein) or internal mammary artery is anastomosed from the ascending aorta to the coronary artery beyond the obstruction providing blood flow to the myocardium (Callaghan, 1986).

Routine Health Care. The informational resources, — nursing care, and medical care provided to all CABG surgical patients in hospital as well as the information and support sought by CABG surgical patients on their own initiative during the first 6 to 7 weeks of the home convalescent period.

Home Convalescent Phase. The period of time immediately following CABG surgical patients' discharge from hospital until return to the cardiovascular surgeon for follow-up assessment 6 to 7 weeks postoperatively.

Supportive-Educative Telephone Program. A series of four to six telephone calls from a cardiac rehabilitation nurse specialist (CRNS) to CABG surgical patients during the first 6 to 7 weeks of the home convalescent period for the purpose of communicating educational information and providing supportive counseling.

Health Deviation Knowledge. The CABG surgical patients' level of knowledge about cardiovascular health problems, related symptoms, anatomy and physiology, measures to control or decrease health problems after hospital discharge, and health problems requiring professional health care assistance as measured by a 7 item questionnaire (See Appendix A).

Therapeutic Diet Knowledge. The CABG surgical patient's level of knowledge of the low sodium, low cholesterol, low fat therapeutic diet, the relationship between therapeutic diet and health, and knowledge of meal preparation and daily routine adjustments needed to maintain the therapeutic diet as measured by a 14 item questionnaire (See Appendix B).

Medication Knowledge. The CABG surgical patient's level of knowledge of the medications required postoperatively including name, indications, dose, action, side effects, treatment of side effects, and independent actions in preparation and administration of medications as measured by a 21 item questionnaire (See Appendix C).

Recommended Physical Activity Restriction Knowledge. The CABG surgical patient's level of knowledge of recommended activity restrictions during the convalescent period as measured by an 8 item questionnaire (See Appendix D).

Recommended Exercises Knowledge. The CABG surgical patient's level of knowledge of recommended exercises during the home convalescent period as measured by a 9 item questionnaire (See Appendix E).

Recommended Rest Knowledge. The CABG surgical patient's level of knowledge of the recommended rest activities during the home convalescent period as measured by a 7 item questionnaire (See Appendix F).

State Anxiety (S-Anxiety). An unpleasant emotional state or condition which is characterized by subjective feelings of tension, apprehension, and worry, and by activation or arousal of the autonomic nervous system (Spielberger, 1972, p. 482) as measured by a 20 item self evaluation questionnaire (See Appendix G).

Conceptual Framework

The conceptual framework for this study is based on Orem's self-care framework of nursing practice. First described by Orem (1959, 1971, 1980, 1985), it was further developed by the Nursing Development Conference Group (NDCG) (1973, 1979) and subsequently applied by Kinlein (1977) and many others (Kearney & Fleischer, 1979; Mullin, 1980; Clark, 1986; Fitzgerald, 1980; Facteau, 1980; Herrington & Houston, 1984). Nurse researchers have demonstrated that the self-care framework, rooted in the work of other nursing theorists beginning with Nightingale, is particularly an evolution of Henderson's work (NDCG, 1979). Concepts from systems theory, action theory, process theory, and organization theory are an integral part of the framework. Also incorporated are scientific and philosophic conceptualizations of human beings (NDCG, 1979; Orem, 1985).

As a general conceptual framework potentially applicable to all nursing situations, it is structured around an individual's need for self-care action and nursing's distinctive role in assisting with self-care. A paramount consideration in the use of Orem's framework is the emphasis placed on the self-care capabilities of humankind. Orem (1985) defines self-care as "the practice of activities that individuals initiate and perform on their own behalf in maintaining life, health, and well-being" (p. 31). This is self-initiated and self-directed deliberate behavior which denotes active as opposed to passive roles for human beings in

relation to their health care.

The definition and general assumptions of self-care are rich in philosophical implications about human nature and individuals as self-care agents. The portion of the definition of self-care describing self-care as the practice of activities denotes broad dynamic behaviors. The whole range of human activities, not merely physical actions, in which people engage to maintain life and health is included. Thus (a) cognitive activities including learning and knowing, (b) social activities including social interactions and social roles, (c) psychological activities including motivation for health and maintaining a healthy self-concept, and (d) physical functioning are all within the realm of self-care. Self-care is far-reaching and by implication the range of potential nursing interventions to assist with overcoming inabilities for self-care (self-care deficits) is equally far-reaching.

The essence of nursing is to activate and maximize the client's self-care agency in a health promoting direction (Mullen, 1980). Orem (1985) recommends a supportive-educative system when the client requires assistance related to acquiring knowledge and skills, decision-making, and behavioral control. The nurse's role is to provide guidance, support, teaching, and consultation. The variation in the nurse's responsibility is directly correlated to the client's level of skill, knowledge, and other individual factors.

The value of gaining sufficient amounts of the necessary

information regarding one's health and self-care needs is obvious. The demand for such knowledge is a therapeutic self-care demand within the cognitive domain. Its presence provides potential for successful self-care; its absence is a guarantee that maximum health and self-care will not occur. Further, learning, a cognitive process, is intimately related to motivation and to attitudes. Low or absent motivation, motivation stimulated by a high level of anxiety, low self-confidence, or pessimistic attitudes will interfere with learning (Van Hoozer et al., 1987; Thorndike, 1982) . The supportive-educative approach by the nurse agency flows from the client's self-care system. This approach evolves possibilities and promotes growth. The self-care abilities of clients are already present, however, clients may wish to maximize their self-care abilities in relation to their own potentials.

Education of clients for self-care is an essential nursing prescription at the supportive-educative level because clients as well as nurses need to (a) develop a self-care philosophy and (b) learn the self-care framework. Using the principles of teaching and learning, the client and nurse should: (a) explore the client's health and self-care potential, (b) have the client articulate health and self-care goals; (c) identify the client's self-care assets and deficits; (d) identify barriers to maximizing self-care potential; and (e) make decisions regarding self-care behaviors. Through the provision of guidance and education

the opportunity for the nursing profession to revitalize individuals and whole communities seems great.

Levin (1978) asserts that self-care education as opposed to patient education allows learners to determine their needs, educational content, treatment, and desired outcome. Self-care education is related to patient education but focuses more on client goals than provider goals. The self-care approach to patient education may not modify patient behavior to improve the health status, however, it may promote patient decision-making regarding acceptable lifestyle adjustments. Thus both content and methods in self-care education help shift the control on health decision-making and health care from the professional to the lay person. Conflicts may arise when the client's values do not conform to the professional values, however, what can be expected from the self-care orientation is a lowering of dependency and its negative sequelae (Casey, O'Connell, & Price, 1984).

Thus, in the supportive-educative system, the nurse assists patients to overcome self-care limitations in order to accomplish self-care. Assistance can be in the form of support, guidance, teaching, or provision of a developmental environment. During the rehabilitation phase following CABG surgery, whether in the hospital prior to discharge or in follow-up contacts after discharge, nursing assists these patients by offering support and encouraging verbalization of feelings. This support can facilitate acceptance of the disease process and treatment thereby decreasing the patient's

level of anxiety.

Nursing also assists the patient in adjusting or adapting to anxiety producing changes in life style that have been imposed due to CABG surgery. Psychological self-care is an important component of the rehabilitation of the CABG patient. The areas of psychological health which can be fostered by the nurse through a self-care perspective include self-esteem, self-knowledge, satisfying interpersonal relationships, environmental mastery, and anxiety management. Some of the major strategies employed by the cardiac rehabilitation nurse during the home convalescent period include counseling, listening, educating, anticipatory guiding, and assisting the patient with behavior modification techniques.

By supplying information and by offering support, nursing assists patients in making informed judgments and increasing their problem solving abilities in relation to their treatment regimens. The ultimate goal of nursing is to assist the patient in accomplishing increased self-care aimed at reaching a state of optimal health and well being. This goal can be facilitated by helping the patient attain knowledge which will influence their self-care behavior.

Assumptions

This study is based upon the following assumptions:

1. A minimum of self-care activities must be performed each day to maintain continued existence; additional activities are required for health maintenance and health improvement; still other activities are required in the event of illness, injury, or disease.
2. Self-care requires general knowledge of self-care goals and practices as well as specific knowledge about self including health state and the physical and social environment.
3. Discharge from hospital and the first 6 to 7 weeks at home after CABG can be particularly anxiety-producing.
4. The self-care framework of nursing practice is an appropriate means for conceptualizing nursing needs of the CABG surgical patient.
5. During the knowledge testing period, participants self-reports of self-care behaviors performed, will accurately reflect their current level of self-care abilities.

Ethical Considerations

The Canadian Nurses' Association Ethical guidelines for nursing research (1983) as well as the University of Alberta Policy (1985) related to ethics in human research were followed throughout this study. Ethical clearance was obtained from the University of Alberta Faculty of Nursing and the University of Alberta Hospitals Special Services and Research Committee prior to the conduct of this study.

Further, ongoing ethical guidance was provided by the highly capable members of the investigator's thesis committee.

The investigator approached all patients considered eligible to participate in the study 2 to 3 days prior to hospital discharge to determine their interest in participating in the study. All patients expressing an interest in the study received a copy of the consent form and any questions regarding the study were answered by the investigator. Participants signed the consent form once they had voluntarily agreed to participate in the study and had verbalized an understanding about the nature and objectives of the research.

Participants were informed of the opportunity to withdraw from the study at any time without jeopardizing their present or future health. All patients who refused or terminated participation in the study continued to receive routine health care by the various health care professionals. Confidentiality of all information received, the right to refuse to participate, and anonymity in reporting of findings were explained and recorded on the consent form. In addition, participants signed the consent form after being informed that there was a 50% chance of not receiving a telephone call.

The possibility that discouragement might occur in the participants not receiving the supportive-educative telephone program was identified. To address this issue, it must be emphasized that all participants received the telephone number of the cardiologist, cardiovascular surgeon, CRNS, family

doctor, emergency department, surgical nursing unit, and dietician. Although providing education to the participant posed little if any risk, that administering an anxiety inventory could evoke participant sensitization to an emotional reaction, was recognized. Following the suggestion of Spielberger, Gorsuch, and Luchene (1983) the term anxiety on the anxiety inventory was replaced with self-evaluation.

Limitations of The Study

Paralinguistics (modification of language by sound, pitch, resonance as well as accessory utterances) and nonverbal visual cues contribute to up to 70% of the meaning of conversation (Curtis & Talbot, 1981). The absence of nonverbal modalities may severely detract from the effectiveness of telephone interactions. Therefore, loss of visual input to participants receiving the supportive-educative telephone program is a recognized limitation.

Second, it is recognized that knowledge and supportive counseling are necessary but insufficient prerequisites for the performance of self-care behaviors. An interview administered knowledge questionnaire was used to assess the participant's level of knowledge about the required self-care behaviors. As such, no attempt was made to observe the expected behavior and contrived situations were used for assessment purposes. Contrived evaluative situations presume certain prerequisites, contain only a sampling of information, and are conducted at a particular point in time; hence, they

are imprecise measurements of the knowledge and behavior being measured.

Third, no attempt was made to differentiate and isolate the supportive from the educative component of the telephone program; thus, it is uncertain which component most effectively influenced the dependent variables. Further, the supportive component of the telephone program was intimately intertwined with the CRNS's counseling expertise, clinical background, and personality. No attempt was made to alter the counseling skills specific to this CRNS, and given the diversity of the CRNS's counseling skills, no theory is proposed on which to base or guide the supportive component of the program.

Fourth, the knowledge questionnaire used for this study measured only six selected areas of knowledge necessary for the performance of self-care behaviors required in the recovery period. Obvious omissions include the topic of sexual functioning and stress management techniques.

Difficulty in achieving consistency of ratings between different raters is a fifth major limitation of any interview administered questionnaire due to the oral component and the inherent subjectivity of this method of measurement. A sixth limitation is that the stress associated with taking an oral examination tends to be greater than with other testing formats.

Seventh, a Hawthorne effect may have been produced because of the attention given in hospital to all study

participants by the principal investigator consequently limiting generalizability. Generalizability is further limited because the telephone program was delivered by one CRNS, with exceptional knowledge of the content area and skill in telephone communication and counseling. The probability of replicating the results of this study, were it implemented by another CRNS with different knowledge, skill, and personality characteristics is unknown. Finally, findings reported in this study are only generalizable to the sample of participants in the setting described herein. The sample consisted of first time, uncomplicated CABG surgical patients in one Canadian locale, thus, preventing generalization of findings to patients with dissimilar biographical characteristics undergoing other cardiac surgical interventions.

CHAPTER II

Review Of The Literature

The purpose of this chapter is to provide a review and critique of the selected literature on in-hospital cardiovascular patient education programs, outpatient cardiac rehabilitation education programs, anxiety and CABG surgery, anxiety and patient education, and telephone use by the health care team. The primary sources of literature upon which this review was based were drawn from the disciplines of nursing, medicine, psychology, and education. Covering a span of almost 20 years, 546 articles, reports, dissertations, masters theses, and books were reviewed. The literature review was largely restricted to empirical research reports, clinical case studies, and expert opinions. The review was further restricted to the English language and the target population was, specifically, those with cardiovascular disease.

In-Hospital Cardiovascular Patient Education Programs

Education of patients recovering from CABG surgery is an important nursing concern as patients are expected to possess the knowledge, skill, and motivation to engage in self-care activities after surgery. The CABG surgical patient requires specific information about medications, postoperative problems, activity progression, and nutrition (Wenger, 1986). Unless the patient understands and adheres to prescribed diet, exercise, and medical regimens following surgery, the operative success of coronary revascularization is limited (Marshall, 1985). Without antecedent knowledge of the

appropriate courses of action necessary for healthy lifestyle changes, it is doubtful CABG surgical patients can produce effective self-care to maximize their physical, psychological and interpersonal health.

The in-hospital CABG surgical patient educational programs described in the literature include strategies evaluating the use of slide and sound presentations (Barborowicz, Nelson, DeBusk, & Haskell, 1980), individual and group teaching methods (Owens, McCann, & Hutelmyer, 1978; White, Lemon, & Albanese, 1980; Linde & Janz, 1979; Christopherson & Pfeiffer, 1980), and structured and unstructured teaching formats (Coombs, 1984; Marshall, Penckofer, & Llewellyn, 1986; Steele & Ruzicki, 1987) with variable effectiveness for increasing patient knowledge. In addition to the eight studies evaluating educational programs designed for CABG surgical patients, six publications reported studies evaluating knowledge levels of MI patients who had received in-hospital patient education using similar strategies (Milazzo, 1980; Mills, Barnes, Rodell, & Terry, 1985; Pozen et al., 1977; Scalzi et al., 1980; Gregor, 1981; Raleigh & Odtohan, 1987).

CABG Surgical Patient Education. Barborowicz et al. (1980) reported teaching advantages of the slide-tape method compared to usual hospital teaching methods for changing knowledge, relieving anxiety and inducing health-enhancing behaviors of uncomplicated CABG surgical patients. Patients were randomly assigned to receive either slide-sound education

(n = 124) or the usual education offered in the hospital (n = 106). Knowledge and anxiety were evaluated before teaching, at discharge, and at 1 and 3 months after discharge. In the hospital, increased knowledge scores were significant in both teaching groups but were more than twice as great in the slide-sound group. After discharge, slide-sound group scores remained high for 3 months, and anxiety, as measured by the State-Trait Anxiety Inventory (Spielberger et al., 1983), decreased significantly. No relationship between anxiety levels and knowledge levels was found. Because the investigator conducted all the pretests, utilizing a knowledge questionnaire with unknown reliability and validity, one cannot confidently conclude that the slide-tape method was superior.

Two research teams, using single group designs to evaluate the efficacy of group education, reported conflicting results (Owens et al. 1978; White et al., 1980). Owens and colleagues (1978) investigated the effectiveness of group teaching for 36 hospitalized MI and CABG surgical patients. The five 45-minute discussion sessions reportedly increased patients' knowledge from pretest to posttest. Still, when the study group was interviewed after hospital discharge the subjects had questions about diet, medications, and the symptoms they were experiencing.

Conversely, White et al. (1980) assessed the efficacy of a group approach for educating 215 hospitalized cardiac surgical patients and recommended that patient educators

re-evaluate their programs because no significant immediate increases in knowledge resulted from the education program. However, as with many of the studies reviewed, it was probably recall rather than knowledge that had been tested because the time between teaching and testing was rather short. Contrary to those who assert that critically ill patients can be taught (Guzzetta, 1981), White et al. (1980) questioned whether the anxiety associated with hospitalization for cardiac surgery might render ineffective any educational efforts undertaken at times of physical and psychological stress.

Linde and Janz (1979) introduced an individualized, postoperative education program for CABG surgical patients. Knowledge tests administered before teaching, at discharge, and at the first and second postoperative visits (1 month and 3 to 4 months later) revealed significant knowledge gains that remained stable at the postoperative visits. The investigators concluded that knowledge reinforcement at the postoperative visits had positively effected knowledge retention. Christopherson and Pfeiffer (1980) also evaluated the effect of individualized teaching but with the addition of a teaching booklet. Using a non-equivalant 3 group design, 41 CABG surgical patients received either a booklet prior to or after surgery or routine teaching. A 20-item knowledge test and a S-Anxiety inventory administered 7 to 10 days postoperatively failed to detect group differences. However, the group with the highest knowledge score demonstrated the lowest anxiety score.

Coombs (1984) developed a content valid and feliable knowledge test to determine the knowledge mastery of 105 CABG patients based on the informal and formally structured teaching program offered in hospital after CABG surgery. The content of Coomb's test included physical activity, convalescent care, medications, diet, risk factors, heart disease and heart surgery, and family. Only 66 (62.8%) patients mastered at least 75% of the CABG predischarge program content.

Marshall et al. (1986) investigated the effectiveness of a structured teaching guide for educating 64 patients about normal postoperative recovery from CABG surgery. Using a nonequivalent control group, pretest-posttest, quasi-experimental design, one group was educated by an unstructured method; the other group received structured teaching plus a guide developed by cardiovascular nurses. The investigators administered a knowledge test, similar to a test devised by Rahe, Scalzi, and Shine (1975), prior to teaching, on discharge from hospital, and 6 weeks after discharge and found no group differences. Both groups attained higher total knowledge scores after surgery but the instrument reliability and validity was not reported.

Using a pre-experimental design and questionable statistical tests, Steele and Ruzicki (1987) explored the knowledge acquisition of CABG patients who had received a structured in-hospital cardiac teaching program. A 21 item knowledge test, developed for the study, was administered the

evening prior to surgery to 38 randomly selected patients and after surgery to 38 different patients. Because demographic data were not collected for any patients, the groups could not be considered equivalent. The researchers may have violated the assumptions of the t-test by failing to assess group equivalence. Given that the comparison groups were, in fact, different subjects, tested at different times, conclusions about the effectiveness of the program are dubious. Even after receiving the program, patients incorrectly answered questions about postdischarge activity, activity pacing, dining out, sexual activity, and stress reduction.

Over all, a review of the eight studies evaluating the impact of various strategies of in-hospital cardiovascular education programs on the knowledge levels of CABG surgical patients leads to several conclusion. First, five studies reported positive program effects (Barborowicz et al., 1980; Owens et al., 1978; Linde & Janz, 1979; Coombs, 1984; Steele & Ruzicki, 1987) and three reported no program effects (White et al., 1980; Christopherson & Pfeiffer, 1980; Marshall et al., 1986). Second, of the five studies reporting knowledge gains, one used a slide-sound presentation, three used structured group teaching sessions, and one used individualized patient teaching. Third, two studies reported that patient knowledge gains were maintained 3 months (Barborowicz et al., 1980; Linde & Janz; 1979) after hospital discharge. Fourth, conclusions about program effectiveness are tentative because all studies failed to use a control group for comparison.

Therefore, none of the studies reviewed had the potential for attributing the observed results to the educational programs.

Cardiac Patient Education. Of the six studies evaluating education programs for MI patients, only Pozen et al. (1977) used a true experimental design. Pozen et al. found that the experimental group patients, after receiving an educational program from the nurse rehabilitator, were significantly more knowledgable at hospital discharge than the control group about the causes of MI and their medications. Even so, the experimental group forgot most of the newly gained knowledge 1 month post-discharge and there was no group difference 6 months later. Also, the hypothesis that the nurse rehabilitator would reduce patient anxiety, by assisting them to understand and cope with MI, was not supported.

Gregor (1981) reported that 100 patients with CAD, using a self-instructional booklet, increased their knowledge scores and retained the information for 2 weeks following hospital discharge. Milazzo (1980), comparing the effects of structured patient teaching incorporating audiovisual material to unstructured patient teaching, found that 25 MI patients in the structured teaching group displayed greater knowledge levels than the unstructured group. Mills et al. (1985) also evaluated the impact of a structured patient education program on 342 patients' knowledge of their illness. The posttest scores on the 23 item multiple choice test were significantly higher than the pretest scores.

Similarily, Raleigh and Odtohan (1987) reported positive

effects of a structured in-hospital cardiovascular patient education program. A knowledge test, administered before hospital discharge and 2 months later, indicated that the group receiving structured individual instruction gained significantly more knowledge than the control group. At hospital discharge, the anxiety level, measured by the S-Anxiety Inventory, of the experimental group had decreased while the anxiety level of the control group increased. Two months after discharge the experimental group's anxiety level was lower than the control group and group differences in knowledge level were no longer evident.

Scalzi et al. (1980) found that a structured in-hospital educational program did not improve the knowledge level of 19 MI patients. Knowledge retention was limited during the acute phase of illness. Patients forgot much of the program content because heightened psychological reactions blocked the permanency of newly learned material. Continued instruction after discharge reportedly improved knowledge about progression of physical activity and other self-care activities. Nonetheless, the in-hospital educational program allowed patients and families, given their limited knowledge retention, to ask specific questions thereby reducing their anxiety. Patients and families asked many questions the first week after discharge; a time when they were more receptive to instruction. Similarily, Gerard and Peterson (1984) found that when 31 MI patients were asked, during a post-discharge interview, about their prior experience with in-hospital

patient teaching, few could recall having been taught by nurses.

Of the six research teams evaluating educational programs for MI patients, five reported significant increases in patients' knowledge level (Milazzo, 1980; Mills et al., 1985; Pozen et al., 1977; Gregor, 1981; Raleigh & Odtohan, 1987) and one researcher reported a sustained knowledge increase 2 weeks after hospital discharge (Gregor, 1981). Only one study (Pozen et al., 1977) used a control group for comparison. Last, in the 14 studies reviewed, descriptions of the knowledge test development was almost nonexistent and validity and reliability reports were limited; researchers evaluating patient education often fail to use valid and reliable data collection tools (MacPhail, 1983; Pohl, 1981).

In-hospital patient education programs have not consistently enhanced knowledge, perhaps, because researchers have no generally accepted standards of success for patient education (Redman, 1981, 1984). Even where knowledge is enhanced, it is often not sustained in the home convalescent period. This may be due to the fragmented, inconsistent teaching resulting when educators fail to use a framework to guide the teaching (Miller, 1984). Others (Murdaugh, 1982; Muzzuca, 1982; Wilson-Barnett & Osborne, 1983) posit that nurses with inadequate teaching skills, educators who fail to recognize barriers to knowledge retention facing patients in acute care settings, lack of physician support, and lack of administrative support may also contribute to variable program

effectiveness.

In short, results from recent research on in-hospital cardiovascular patient education are conflicting. Although various modes of presentation have been examined with respect to the in-hospital setting, few definitive conclusions can be drawn in regard to the superiority of a particular approach. The current advanced status of patient education and the increased availability of technology should serve as a stimulus for professionals to develop and evaluate interactive educational programs and effectively apply existing techniques (Wenger, Cleeman, Herd, & McIntosh, 1986).

Outpatient Cardiac Rehabilitation Education Programs

Of the few studies that have examined outpatient education programs, interpretations are questionable, given the lack of experimental control and small sample sizes. Several researchers found that patients gained knowledge of their condition and medical regimen in outpatient rehabilitation programs (Rahe, Tuffli, Suchor, & Arthur, 1973; Rosenberg, 1971; Scalzi et al., 1980; Raviaro et al., 1984; Morley, Ribisl, & Miller, 1984). Other investigators found that patients in outpatient rehabilitation programs failed to improve their understanding of CAD, life style changes, or psychologic status (Bengtsson, 1983; Stern & Cleary, 1982; Sivarajan et al., 1983; Mayou, 1981; Horlick et al., 1984).

Four studies investigating educational strategies in outpatient rehabilitation programs were found in the literature. Of these, two used a sample including CABG

surgical patients and two studied only MI patients. Raviaro et al. (1984) examined the psychological and psychosocial functioning of 48 cardiac patients who had either experienced MI or undergone CABG surgery. Using a nonequivalent control group, posttest only design, subjects were assigned nonrandomly to either a treatment condition and participated in a 3 month exercise based cardiac rehabilitation program or a routine care condition. Patients in the treatment group participated in 3 one-hour exercise sessions each week for 3 months. Informal patient education was provided when patients raised questions with their therapist.

The treatment group, assessed 3 months and 7 months later, evidenced improved understanding of heart disease, positive self-perceptions, and better psychosocial functioning. On the other hand, the treatment did not influence trait or state anxiety or perceived disruption in daily functioning. The results require cautious interpretation because knowledge about CAD was assessed by asking patients only 5 open-ended questions; it is unclear if the same individual implementing the treatment also administered the knowledge test. The coding and scoring of patient answers were not discussed.

Morley et al. (1984) evaluated 2 teaching methods (slide-tape and programmed instruction) with a control method of traditional lecture for 20 patients enrolled in a cardiac rehabilitation program. The researchers found greater knowledge gains in the slide-tape (n = 5) and

programmed-instruction (n = 8) treatments than the traditional lecture (n = 7) at 1.5 weeks whereas at 6 weeks only the slide-tape method maintained greater knowledge gains. However, the superiority of the slide-tape and programmed-instruction treatments may have resulted from the repetition of content received by these groups; both groups attended the routine lecture and then received the treatment. Additional confounding variables included allowing patients to take the programmed instruction booklet away from the test site and using identical test versions in the retest. These factors limit confidence in concluding that test scores increased because of the teaching methods employed.

In a randomized control group, time series study of 358 MI patients from 7 hospitals, Sivarajan et al. (1983) examined compliant behaviors 3 and 6 months after patients had attended group teaching/counseling sessions. Patients' knowledge levels were not assessed and the teaching and counseling program demonstrated only limited effectiveness for facilitating compliant behavior. Horlick et al. (1984) found that a cardiac rehabilitation education and group discussion program, administered to a randomly selected group of 83 MI patients, failed to produce any differences in a large number of behavioral and psychological measures including state anxiety. The researchers recommended that cardiac rehabilitation focus on high risk, anxious, and depressed patients.

The outpatient cardiac rehabilitation literature contains various descriptions of outpatient cardiac rehabilitation

programs by those who espouse the beneficial effects of education on patient recovery. There is limited empirical support for the premise that traditional patient education has beneficial results. The paucity of studies evaluating outpatient educational programs for CABG surgical patients implys that few attempts have been made to deal with educational and counseling rehabilitation needs after CABG surgery; it cannot be assumed that same approaches be used as after MI (Lamm, 1986).

Anxiety and CABG Surgery

As evidenced in several of the evaluative studies of both inpatient and outpatient cardiovascular education programs, reducing patient anxiety along with increasing their knowledge, was an important program objective (Pozen et al., 1977; Barborowicz et al., 1980; Christopherson & Pfeiffer, 1980; Raleigh & Odtohan, 1987). Indeed, since the advent of cardiac surgery, there has been an increasing body of literature concerning the long-term psychological sequelae for the patient. Researchers have reported that many patients have less than optimal psychological functioning after open-heart surgery (Blachly & Blachly, 1968; Kimball, 1969, 1972; Heller, Frank, Kornfeld, Malm, & Bowman, 1974; Frank, Heller, & Kornfeld, 1972; Blacher, 1978). More recently, the psychological adjustments of CABG surgical patients have been explored (Rabiner & Willner, 1976; Gundle, Reeves, Tate, Raft, & McLaurin, 1980; Ramshaw & Stanley, 1981, 1984; Kornfeld, Heller, Frank, Wilson, & Malm, 1982; Bruce, Bruce, Hossack, &

Kusumi, 1983; Horgan, Davies, Hunt, Westlake, & Mullerworth, 1984; Radley & Green, 1985; Jenkins et al.,1983; Gilliss, 1984; Wilson-Barnett, 1981). Seven of these reports include either descriptive or empirical evaluations of patients' anxiety levels after CABG surgery.

Rabinir and Willner (1976) reported that 15% of 46 patients followed for 18 months after CABG surgery experienced psychological symptoms. Most suffered from anxiety and depression. With rare exceptions patients experiencing anxiety after the hospitalization did not experience anxiety while in hospital. Ramshaw and Stanley (1981) also investigated the psychological sequelae of CABG surgery for 53 patients, 12 to 27 months after surgery. The majority of the patients described an overall decrease in activity, somatic concerns, and feeling anxious; they were unable to cope, easily irritated, and even, aggressive.

Radley and Green (1985) interviewed 40 CABG surgical patients 11 months after surgery regarding their course of recovery, activity pattern, and style of adjustment to surgery. A questionnaire, based on the work of others (Herzlich, 1973; Kimball, 1969; Ramshaw & Stanley, 1981), was designed to assess patients' adjustment to CABG surgery. Three main styles of adjustment were determined: accommodation, active-denial, and resignation. A combination of slow healing following surgery and lack of employment lead these individuals to focus on their limitations with consequent anxiety. Those patients who made a large degree of

accomodation postoperatively displayed decreased activity compared to their preoperative status. These patients readily admitted to feeling anxious during recovery; they coped by closely monitoring and controlling their lives.

Radley and Green suggested that patients might differ in the information they seek and in how they respond to setbacks either in their physical condition or in their social lives. The investigators found that a discrepancy in perspective between patient and physician on issues of physical illness and social adjustment lead to uncertainty and anxiety in the patients. The findings suggested that patients making accommodations are best able to surmount potential difficulties leading up to CABG surgery and to face setbacks thereafter. This insight is important for nurses counseling patients in the home convalescent period.

Jenkins et al. (1983) interviewed and tested 318 patients before and 6 months after elective CABG at 4 university medical centers. Although angina was completely relieved for 69% to 85% of patients, the first postoperative month was particularly difficult for 43% of patients, as measured by the S-Anxiety Inventory (Spielberger et al., 1983), and 37% of patients were unable to carry out usual activities for 25 or more days. Similarily, Horgan et al. (1984) assessed anxiety levels of 77 CABG surgical patients before surgery and 3 months and 12 months after surgery. After surgery, abnormally high levels of anxiety, measured by the S-Anxiety Inventory, were present in about 50% of patients. Anxiety level was not

correlated with the surgical result.

Two nurse researchers reported similar problems and concerns expressed by CABG patients in the early home convalescent period. After interviewing 60 patients over a 24 month period after CABG surgery, Wilson-Barnett (1981) found that just over 50% (37/60) of the patients had resumed full activities in the postoperative year and 30 activities were described as being difficult for some time post-operatively including lying flat, driving, bending over, making the bed, and having the courage to go anywhere alone. More importantly, from the patients' perspective, discharge teaching was sadly lacking. There was immense variation in the amount of advice about recovery and activities reportedly received by patients from hospital staff. The majority received either "none" or a few blanket phrases such as "take it easy". This omission lead to considerable anxiety for 14 patients.

Gilliss (1984) conducted an exploratory study to identify the major sources of stress for 71 patients recovering from CABG surgery. After the first week at home, patients began to physically test themselves, often resulting in discouragement at the physical limitation which became apparent. The 6 week assessment by the cardiac surgeon was viewed as a milestone. Because so much emphasis was placed on this appraisal and because it was often the first contact with the health care system since hospital discharge, patients approached the visit with many questions. Most patients reported great dissatisfaction with this contact. Patients were reportedly

unable to ask their questions and their complaints were minimized as being normal. Gilliss concluded that because of the dramatic decrease in contact with the health care system during the first 6 weeks at home and because most patients had unanswered questions and concerns, regular telephone contact with patients and spouses would have provided the couple an opportunity to seek information, validation, or to experience catharsis. Further, early detection of problems and appropriate referrals might have facilitated problem solving, and thus, decreased patient anxiety. Gilliss suggested follow-up care via phone calls and home health visits, to pinpoint problems soon after discharge thereby preventing unnecessarily prolonged recovery.

The results of these studies and others (Hasser, 1979; Hijeck, 1984; Yamada, 1984; Cozac, 1985) indicate that CABG surgical patients, unaware of what to expect in the home convalescent period, experience anxiety. A review of the literature supports the premise that many patients after CABG surgery appear more disabled by anxiety than by the physiological consequences. Further, the literature indicates that the patient's anxiety influences cognitive functioning and the subsequent performance of self-care behaviors. However, only within the last 2 decades have there been efforts to evaluate the frequency, severity and consequences of anxiety in CABG surgical patients.

Anxiety and Patient Education

Anxiety is a commonly occurring emotion which can preclude the possibility of effective patient education (Whitman, Graham, Gleit, & Boyd, 1986; Webb, 1983). Patients' level of anxiety can determine their readiness to learn and subsequent ability and willingness to carry out a therapeutic regimen (Cronbach, 1977; Brundage & Mackeracker, 1980). Health professional who blindly proceed with patient teaching without considering patients' anxiety levels not only conduct a futile exercise but also run the risk of losing rapport and trust that could enhance future efforts (Falvo, 1985).

The relationship between learning and anxiety is complex (Sieber, 1977; Redman, 1984). Mild to moderate anxiety improves a person's learning capacities. Severe anxiety, however, results in a reduced perceptual field and the inability to focus attention. Incidental learning is lost and behavior becomes oriented towards avoidance. The learner loses the ability to search for relevant information, analyze, formulate meanings, and integrate and retrieve information (Sieber, 1977). That anxiety appears to have a detrimental effect on learning is apparently true for a wide variety of instructional methods (Lefrancois, 1982; Tobias, 1979). Although considerable attention has been focused on patient education as a means of fostering understanding and reducing anxiety, the relationship between learning and heightened anxiety states in cardiac patients remains unclear.

Budan (1983) and others (Meyer, 1964; Langer, Janis, &

Wolfer, 1975; Sime, 1976; Barborowicz et al., 1980; Finesilver, 1980; Toth, 1980; Johnson, 1972) found that patient education effectively reduced patient anxiety. Others, however, found educational programs ineffective in reducing patient anxiety (Kubinec, 1982; Christopherson & Pfeiffer, 1980; Pozen et al., 1977; Raleigh & Odtohan, 1987). Three of these researchers specifically examined the relationship between cardiac patients' level of knowledge and level of anxiety (Budan, 1983; Kubinec, 1982; Barborowicz et al., 1980).

Budan (1983) evaluated the effectiveness of an in-hospital cardiovascular patient education program using a single group pretest-posttest design and explored the relationship between learning and anxiety. After exposure to the patient education program using a variety of media presentations (written material, slide-tape programs, individualized instruction), 12 patients demonstrated significantly increased knowledge levels and decreased anxiety levels (measured by the S-Anxiety Inventory). Advancing age did not hinder patients' ability to learn whereas patients with a high school level education or less did not demonstrate significant knowledge gains. The results of this study must be viewed, however, in the light of its limitations. Like many clinical studies on patient education, the sample size was small, there was no control group, and randomization was not possible. Additionally, the sensitizing effects of pretesting was not controlled by the design.

In contrast, Kubinec (1982) was unable to demonstrate knowledge gains or reduction of anxiety in 24 cardiac patients enrolled in a structured outpatient cardiac rehabilitation. Nor did Kubinec, like Barborowicz et al. (1980), find a significant association between knowledge and anxiety. Other investigators found educational programs ineffective in decreasing patients' anxiety but the patients demonstrated low anxiety after making behavioral changes 2 months (Raleigh & Otdohan, 1987) and 6 months after hospital discharge (Pozen et al., 1977).

Stanton, Jenkins, Savageau, Harken, and Aucoin (1984) explored patients' perceptions of the adequacy of the instruction they had received and also identified commonly experienced anxieties and adjustments during the first 6 months after surgery. A standardized interview of 249 patients revealed that more than half felt they had not been adequately prepared for the emotional reactions they encountered at home. Meyer and Latz (1979) reported that emotional distress, particularly anxiety, influenced postoperative cardiac surgical patients' ability to learn, and subsequently, their rehabilitative progress.

In short, attempts to clarify the relationship between CABG surgical patients' level of anxiety and level of knowledge are meager. Given the contradictory findings in previous studies, further research regarding the relationship between learning and anxiety in CABG surgical patients is warranted. Support is provided for the inclusion of a

counseling component in a cardiac rehabilitation education program designed to promote self-care in CABG surgical patients.

Telephone Use by the Health Care Team

A variety of professionals have explored the use of the telephone as a means of assessing and delivering health care, education, and counseling to the public with variable success (Pederson & Babigian, 1972; France, 1975; King, 1977; Bertera & Bertera, 1981; Horn, Manuel, & Olvany, 1982). Further, the telephone has been used to educate and counsel people on an individual basis (Altman, 1985; Pope, Yoshioka, & Greenlick, 1971; Heagarty, Robertson, Kosa, & Alpert, 1968; Bartlett & Meyer, 1976; Nicklin, 1981; Stirewalt, Linn, Goday, Knopka, & Linn, 1982; Schreiner, Gresham, & Green, 1979) and in groups (Evans & Jaureguy, 1981). Education and counseling by telephone has been successful to varying degrees in affecting health-related knowledge and behavior (Wilkinson, Mirand, & Graham, 1977; Stirewalt et al., 1982; Darnell et al., 1985).

Much of the existing research on the use of the telephone by health care professionals has focused on epidemiological investigations such as tracking demographic characteristics of callers, community health needs assessment, and infrequently on assessing post-call behavior. There are few studies attempting to establish the extent to which callers' knowledge, attitude, or behavior may change following telephone counseling (Auerbach & Kilmann, 1977). Of the 18 studies found which described the use of the telephone for

counseling and teaching purposes, eight involved MI/CABG patients.

There is potential for systematic education and support of chronic disease patients through telephone contacts both received by and initiated by health professionals. A cancer telephone information program that provided pre-recorded messages was evaluated (Wilkinson & Wilson, 1983; Wilkinson et al., 1977, 1976), although, this program was different from most programs in that no substantive interaction between the caller and a health professional occurred. Altman (1985) investigated the effects of a telephone information service on the post-call behavior of people with undiagnosed symptoms of cancer. The findings support the important role that telephone information serves in the secondary prevention of cancer and in the delivery of effective health programs. Bertera and Bertera (1981) found regular telephone counseling of hypertensive patients to be as effective clinically, and more cost effective than clinic visits. Telephone counseling of pediatric diabetics and alcoholics has also been reported though on the basis of contact being initiated by the caller when requiring help to cope with acute episodes (Hoffman, O'Neill, Khoury, & Bernstein, 1978; Intagliata, 1976).

The management of five common pediatric problems by pediatric nurse practitioners, pediatric house officers, and pediatricians was evaluated by taping telephone calls to the three groups and scoring them for history taking, disposition, and interviewing skills. The pediatric nurse practitioners

scored higher in all areas than the other two groups using the telephone (Perrin & Goodman, 1978). More recently, Helm-Estabrooks and Ramsberger (1986) presented a case study suggesting that appropriate aphasia rehabilitation programs could be conducted with success over the telephone. They found that the patient's ability to produce and understand grammatical constructs improved, supporting the use of telephone therapy with patients who were unable to attend clinic sessions because of geographic inaccessibility or transportation problems.

Evans and Jaureguy (1981) conducted an experimental study to evaluate the effectiveness of an outreach telephone program for 12 isolated legally blind elderly clients. The subjects were assessed before and after the study for level of social activity, affective disorder, and other variables related to personal goal attainment. The experimental group was telephoned weekly by a counselor at a designated time for 8 weeks and was put into a conference situation in which participants could talk with each other. The telephone program permitted expression of psychosocial problems, provision of information about resources, group problem-solving, development of comradery, and building of confidence among group members. Moreover, individuals at risk for affective disorders were identified. The researchers recommended marked changes in service delivery to the chronically ill with an emphasis on outpatient telephone supportive intervention.

Evans, Fox, Pritzl, and Halar (1984) described a

telephone group counseling program for 16 patients with physically disabling neuromuscular disorders designed to address their feelings of discouragment and loneliness related to being too inactive to remain healthy. A majority of the participants reported being less anxious and more socially involved as a result of the intervention. Ease with which groups were conducted and positive feedback from participants suggested that researchers should explore the potential of treating affective problems and knowledge deficits of other patient populations, such as cardiovascular patients, through regular telephone contact.

In this vein, researchers have used the telephone as a method of providing follow-up for MI/CABG patients (Nicklin, 1986; Stevens, 1985; Frasure-Smith & Prince, 1985, 1986; Bilodeau & Hackett, 1971; Owens et al., 1978; Billie, 1977; Fletcher et al., 1984; Daltroy, 1985; Prowse, 1987). As the length of hospital stay has decreased, cardiovascular patients have become increasingly responsible for self-care after discharge. The prospect of going home is often a disturbing and frightening one for cardiac patients regardless of the nature of the postoperative course (Hart & Frantz, 1977; Yamada, 1984; Cozac, 1985). In addition, Newby (1980) reported that, despite individual instruction given to CABG patients by the nursing staff, patients failed to retain this information. They were reluctant to take up the staff's time and ask questions they perceived might be considered trivial. Newby concluded, from data obtained by home visits to patients after

discharge, that CABG surgical patients required continued education and support in the home convalescent period; the telephone has been investigated as a means to this end.

Through a telephone callback system, a Canadian nurse researcher (Nicklin, 1986) examined the types of problems encountered at home by 217 patients recovering from cardiac surgery. Patients were encouraged to telephone the on duty nursing coordinator at any time. Nicklin discovered that many of the 253 patient concerns were expressed within the first 2 weeks after discharge; concerns largely related to the cardiopulmonary system (31.3%) followed by medication problems (14.7%) and gastrointestinal problems (13.4%). Over a 4 month period, 217 calls were received, 40% of which were received during the first week after the patient returned home. Of these calls, 40% were significant enough to warrant directing the patient to an emergency department or to contact the physician.

Health professionals cannot, before the patient is discharge from hospital, anticipate all the problems which might arise during the home convalescent period. Because problems arise at home for which teaching and counseling are required, there is a need for more or different information, beneficial to the patient and family during the rahabilitation phase. The system of telephone callback may be one important strategy to provide patient feedback, to identify patient learning needs, and to reinforce predischarge education (Nicklin, 1986; Moynihan, 1984).

Using a pretest-posttest, control group, experimental design, Stevens (1985) investigated the impact of patient education follow-up by telephone on the knowledge level of MI patients. Stevens found that the telephone teaching program, delivered to patients during the first 6 to 8 weeks following hospital discharge, effectly increased 29 experimental group patients' knowledge in the areas of the MI, its effects and related self-care measures and recommended exercise compared to the control group. Although group differences were not found in the teaching areas of diet, medications, activity restrictions and rest, the experimental group evidenced a higher mean knowledge score than the control group in all areas except rest. As well, 29 MI patients, when telephoned by a cardiac nurse, verbalized a number of questions, concerns, and symptoms related to recommended lifestyle changes and personal or home problems.

Frasure-Smith and Prince (1985) selected the telephone as the preferred method for monitoring 453 cardiac patients' stress level on a monthly basis after hospital discharge. The researchers suggested that telephone monitoring had advantages over a face-to-face administration of a questionnaire in terms of cost and potential reduction in patients' stress levels. Furthermore, given the low return rates and time delay in receiving mailed questionnaires, the telephone was deemed more expedient. Use of a tape recorded telephone questionnaire was also considered to be too impersonal. As well, patients could become frustrated with answering questions if the allotted

time interval for answering each question was too long or short.

More recently, Frasure-Smith and Prince (1986) described outcomes 6 months after MI patients participated in a nursing intervention program. The program, designed to reduce stress levels and thereby prevent recurrences of MI, provided individualized interventions involving a combination of teaching, support, and referral strategies. The average high stress patient required only 6 hours of nursing contact. The results suggested that the program lowered stress scores and reduced 1 year death rates by 50% but made no difference in hospital readmissions.

Bilodeau and Hackett (1971) initiated bi-weekly telephone follow-up calls to MI patients. Immediately following hospital discharge, MI patients raised many concerns and questions about the nature of the illness, medications, nutrition, medical care following discharge, smoking, work and activities, illness and death of other MI patients, family attitudes, and current and future health states. Accordingly, Granger (1974) suggested that telephone contact with the MI patient immediately following hospital discharge might reduce their anxiety.

Owens et al. (1978) gave medical and surgical cardiovascular patients the telephone numbers to call if questions arose after discharge but none utilized this service even though they had questions when contacted by the investigator. When the study group was interviewed after

discharge, questions were frequently asked about diet, medications, and the symptoms they were experiencing. Fletcher et al. (1985) reported the utility of individual telephonically monitoring home exercises for 46 CABG surgical patients for whom travel time, distance, and lack of accessibility to structured, medically supervised cardiac rehabilitation programs posed significant problems. Fletcher et al. found that the system of home telephone audio and electrocardiogram (ECG) monitoring was practical and feasible because the transmission system was technically sound and the ECG tracing for heart rate and rhythm was clear and easy to interpret by the consulting cardiologists. Daltroy (1985) used the telephone, without success however, as a means of providing educational counseling to a group of 174 cardiac patients in an effort to increase attendance in the first 3 months of outpatient cardiac exercise programs.

The potential advantage of health telephone programs combine some of the positive components of mass media - high exposure, convenience, cost effectiveness - with a positive component of face-to-face interaction - personalized attention. Findings from the literature suggest that the telephone can be effective for providing follow-up care for enhancing knowledge, reducing anxiety and subsequently facilitating self-care actions.

In summary, a review of the literature leads to a number of conclusions. First, in-hospital and outpatient cardiovascular education programs have not consistently

enhanced CABG surgical patients' knowledge or reduced their anxiety. Even when knowledge is enhanced, it often is not retained in the early home convalescent period. Second, CABG surgical patients, unaware of what to expect in the home convalescent period, experience anxiety. The first few weeks of the home convalescent period are particularly anxiety-provoking for CABG surgical patients; subsequently, they have many unanswered questions and concerns. Third, given the conflicting findings in previous research, further empirical research regarding the relationship between anxiety and knowledge in CABG surgical patients is warranted. Finally, the literature supports the inclusion of a counseling component in an educational program delivered by telephone to promote self-care in CABG surgical patients.

CHAPTER III

Methods and Procedures

The purpose of this chapter is to present the methodology and procedures used in this experimental study. The discussion focuses on the research design, a description of routine in-hospital teaching and the supportive-educative telephone program, sample, setting, instrumentation, selection and training of research assistants, data collection procedures, and pilot study procedures. Finally, data analysis procedures are discussed.

Design

A posttest only, control group experimental design was used for this study. All patients eligible for participation in the study were randomly assigned, after hospital discharge, to either a control or an experimental group. Measures of state anxiety and knowledge were obtained on both groups 6 weeks after surgery. The experimental group participated in the supportive-educative telephone program beginning within 1 week after hospital discharge and concluding 6 weeks hence (See Table 1).

According to Kerlinger (1986), the posttest only experimental design has the best theoretical control system of any design, is statistically and structurally elegant, and if extended to more than one variable, it can test several hypotheses at one time (p. 306). Moreover, it is superior to the troublesome aspect of before-after designs, which may decrease the external validity of the experiment through the

sensitizing effect on subjects created by a pretest. When a pretest sensitizes both groups, it can make the experimental subjects respond to the treatment, wholly or partially, because of the sensitivity, resulting in a lack of generalizability. It may be possible to generalize to pretested groups but not to unpretested ones. Thus Campbell and Stanley's (1963) suggestion was heeded: When unusual testing procedures are to be used, use designs with no pretests. Bruce et al. (1983) emphasized that patients are frequently unable to concentrate, and to complete a lengthy and complex questionnaire during the acute stage of illness. After a reasonable recovery, this becomes feasible. Finally, randomization tends to produce study groups comparable with respect to known as well as unknown factors and removes investigator bias in the allocation of subjects (Friedman, Furberg, & DeMets, 1985).

Table 1

Research Design

	Hospital Discharge	Treatment	Posttest
Experimental Group	R	X	A* B**
Control Group	R		A B

Note. * = S-Anxiety Inventory
** = Knowledge questionnaire
R = Random assignment

Routine In-Hospital Teaching

In the study hospital both preoperative and postoperative teaching are designed and implemented by the nursing staff in collaboration with the dietician, the cardiovascular surgeon, the anesthetist, the physiotherapist, and the cardiologist. Filmstrips, models, and booklets are available to the staff for the purpose of patient teaching. The CABG surgical patient receives both group and individualized teaching with an emphasis on family involvement. Members of the cardiac self-help group, composed of individuals successfully recovering from CABG surgery, visit the surgical ward each Wednesday. They answer questions and discuss concerns of available preoperative as well as postoperative patients.

Prior to hospital discharge, the patient and significant others review diet, medications, treatment procedures, activity restrictions, recommended exercises, as well as follow-up procedures such as exercise tolerance testing. All patients on the surgical ward are given the telephone number of their cardiologist, their family doctor, the emergency department, the CRNS, and the surgical nursing unit along with two patient teaching booklets (Burrows & Gassert, 1984). Information is provided regarding the cardiac self-help group along with the time and dates of their monthly meetings. Patients are informed of the available long-term cardiac rehabilitation programs which begin 6 weeks after hospital discharge. Additionally, prior to hospital discharge, each study participant was visited by the CRNS to establish rapport

with the participants who would receive the telephone program.

Finally, the patient returns to the study hospital's cardiology department approximately 6 to 7 weeks after surgery for an exercise tolerance test and a physical assessment by the cardiologist. The personnel in the Cardiac Rehabilitation Unit in the study hospital continue the follow-up evaluation of the patient after hospital discharge. For the purpose of this study, specifically, for the duration of the data collection period, patient follow-up consisted of the delivery of the supportive-educative telephone program to the experimental group only. The control group did not receive follow-up care from the cardiac rehabilitation personnel until the 6 week follow-up visit to the cardiologist.

The Supportive-Educative Telephone Program

The supportive-educative telephone program was an interactive program involving information exchange between the participant and the CRNS through a series of four to six CRNS initiated telephone calls during the first 6 to 7 week home convalescent period. The program was designed to assist participants to gain knowledge and improve decision-making and coping skills thereby decreasing their anxiety. The goal of the telephone program was to reinforce cognitive and affective information previously provided to the patient during hospitalization and to supplement information that the hospital health care team may not have covered.

Likewise, the goal of the supportive-educative telephone program was to enable participants to incorporate the

information into their behavior improving their potential for positive self-care rather than merely enabling participants to regurgitate the information back to the principal investigator. The principles and philosophical underpinnings of this program are clearly outlined by Teo and Kappagoda (1984). Thus, the purpose of the telephone program was to reinforce postoperative teaching and to address the need for new information about specific concerns accompanying the home convalescent period; concerns CABG surgical patients often failed to consider while hospitalized.

The supportive-educative telephone program was implemented by a CRNS, with acknowledge expertise in cardiac rehabilitation, 11 years experience in cardiovascular surgical nursing, and excellent communication and analytical skills. The role of the CRNS was to empower participants to act on their own behalf by providing information, assisting with practical problems of implementing recommendations, suggesting alternatives, and providing support in the acceptance and integration of new knowledge. Based on principles of adult teaching and learning, the participant received information that was relevant and comprehensible.

The CRNS conducted an initial assessment of each participant's learning needs, attending to the participants' tone of voice and choice of words. Through the initial verbal exchange, the CRNS assessed participants' life styles, general attitudes, and feelings about their condition and treatment, and their receptivity to new information. Learning

capabilities were determined by noting the participants' language structure and level of communication. The CRNS continued to assess participants' learning needs during each subsequent telephone call. The CRNS reinforced, clarified or introduced new information based upon this nursing assessment.

The specific content of the individualized teaching consisted of the participant's present cardiovascular illness, its effects and related self-care measures, diet, medications, physical activity restrictions, exercises, and rest. This content is consistent with the recommendations outlined by the American Heart Association (1986). The CRNS was more than a bearer of information; the CRNS was also a facilitator of learning and problem solving rather than only a teacher of facts.

An important component of the supportive-educative telephone program involved encouraging the participants to ventilate their problems and concerns, to obtain information about their postoperative feelings and behaviors, to receive support to reduce reliance on unhealthy defense mechanisms, and to increase coping skills. Thus, the CRNS, a competent source of advice and information, also helped participants clarify issues and reach goals compatible with their priorities and life styles. In consultation with the participant's cardiologist, referrals to outside community agencies were made as deemed necessary.

The participants received the initial telephone call during the first week of their home convalescent period.

Prior to the termination of this call, the CRNS and the participant negotiated a convenient date and time for subsequent calls. In addition, participants were reminded to call the CRNS during working hours should any problems and concerns arise between calls.

The supportive-educative telephone program was delivered from a room located in the cardiac rehabilitation department at the study hospital. The CRNS shares the telephone in this room with a CRNS who provides follow-up to MI patients. This room, containing a variety of exercise equipment, is also used for supervised exercise training of cardiovascular patients. Each telephone call was tape recorded and the cassette tapes were locked in a filing cabinet in this room.

Sample

Criteria for Selection

The population from which this convenience study sample was drawn included all patients admitted to a large urban, teaching hospital in western Canada and scheduled to undergo CABG surgery between September 1986 and February 1987. The sampling frame was limited to patients undergoing CABG surgery for the first time. Additional criteria for admission into the study included:

1. scheduled for nonemergency CABG surgery without additional cardiac surgical procedures,
2. over 18 years of age,
3. oriented to time, place and person with no history of acute or chronic psychiatric problems,

4. able to read, write, and speak in the English language and capable of responding in an interview situation,
5. access to a telephone in the home,
6. no major cardiac complications such as uncontrolled arrhythmias or congestive heart failure,
7. verbalized intention to return to the cardiovascular surgeon for a 6 week follow-up appointment.

Sample Size

The study sample size was determined by sample size tables (Cohen, 1977) using the values for the significance criterion (a), the effect size (d), and the desired power. According to Cohen, when the investigator has little basis for setting the desired power level, the value of .80 is appropriate. This arbitrary but reasonable value is offered for several reasons, the chief among them taking into consideration the implicit convention for a of .05. The investigator anticipated a medium effect size which, by convention, is operationally defined as .50 for the t-test and .30 for the Pearson product moment correlation coefficient. Given the lack of previous research to estimate power, a .80 level was chosen. Therefore, the investigator wished to detect a medium effect (d = .50) with a significance criterion at .05 (two-tailed) and wished power to be .80. That is, if the supportive-educative telephone program did have a medium sized effect, the investigator was prepared to run a risk of .20 of failing to detect a difference when, in fact, a difference existed in the population, compared to the .05 risk of

concluding one group's superiority when the means of the control and experimental groups were equal in the population. Based on the stated specifications, 68 participants were required in each group. However, time and monetary constraints limited the sample to 74 participants, 37 in each group, lowering the power level to .47. (However, as discussed in a later chapter, the effect size in the population was probably large rather than medium, underestimating the proposed .47 power level.)

Setting

The study was conducted in a large urban teaching hospital in western Canada. This hospital is a 1300 bed, acute care teaching facility, and the major specialty care referral centre for the province and the Territories. Patients scheduled for CABG surgery are routinely admitted to a 25-bed cardiovascular surgical nursing floor the day prior to surgery. The patient and family have an opportunity to tour the intensive care unit the evening before surgery. Following surgery, the patient is admitted to an 10 bed cardiovascular intensive care unit. After approximately 48 hours the patient is transferred back to the surgical nursing ward until hospital discharge approximately 6 days later.

Instrumentation

The two instruments selected to measure the effectiveness of the supportive-educative telephone program include a knowledge test based upon criterion measures of nursing care developed by Horn and Swain (1977) and the State Anxiety

(S-Anxiety) Inventory (Spielberger et al., 1983). A description of each instrument and the available reliability and validity data are presented in the following discussion.

Knowledge Questionnaire

Horn and Swain (1977) developed criterion measures of nursing care based on Orem's (1985) conceptual framework. Different criterion measures focus on specific aspects of the patients' physical and emotional status, the extent of their health knowledge, and their abilities to perform self-care. Based upon these measures of nursing care a knowledge test with a detailed user manual was developed.

Reliability. Pretesting and interrater reliability testing of the measurement techniques were conducted for 414 of the items. Of the 414 quality measures in the instrument, 109 attained the stringent criteria set for reliability. That is, for those 109 measures, the pairs of nurse observers showed a .80 index of agreement which was statistically significant at the .05 level; further, the confidence limits for the coefficient excluded the .60 index at its lower bound. An additional 31 measures met at least two of the criteria; the index of agreement was .80 or better and was statistically significant at the .05 level. The criterion with respect to confidence bounds was not attained for 140 measures because agreement was absolute ($r = 1.00$) and, thus, no bounds were determinable. One hundred and eight of the measures need further testing because interrater reliability was not established for these measures.

To date, reliability testing of this instrument is limited as measures of association are different than measures of agreement. Giovannetti (1981) and more recently Soeken and Prescott (1986) recommend the use of the statistic Kappa for interrater reliability assessments. Using Kappa, simple agreement between observers is corrected for chance agreement, and then compared with the observer variability to assess the final significance of the observed agreement (Giovannetti, 1981, p. 158).

Validity. With the assistance of the National Advisory Panel and clinical nurse specialists, 539 items were generated and refined, using 8 universal and 10 health deviation self-care demand categories adapted from earlier work by Orem (1971). Content validity has been established for all 539 items on the basis of two criteria proposed by Nunnally and Durham (1975). These criteria are that the items in the instrument and the design of the measures themselves utilize sensible methods of construction. Variables identified within the instrument were chosen because they represented physiological, psychomotor, cognitive, or affective components of the areas of concern to nursing whether related to universal demands or demands arising from a health deviation.

Selection of Measurement Items. According to Orem (1985) health-deviation self-care requisites exist for persons who are ill, are injured, have specific forms of pathology including defects and disabilities, and who are under medical diagnosis and treatment (p. 97). The purpose of this study was

to evaluate CABG surgical patients' knowledge and their ability to perform self-care after hospital discharge. Therefore, interview questions were selected from the health deviation component of the knowledge questionnaire developed by Horn and Swain (1977). The investigator selected questions from the health deviation component of this instrument in the following areas: the health deviation (CAD), its related effects and self-care measures, medications, diet, physical activity restrictions, exercises, and rest.

Instrument Scoring Procedures. The knowledge questionnaire was designed to evaluate the presence of knowledge that would be helpful for successfully managing at home or knowledge that would be harmful. Knowledge about health problems that is correct and complete is most helpful. A mixture of correct and incorrect knowledge, lack of knowledge, or irrelevant knowledge is placed midway between being helpful or harmful to successful management of health problems after discharge. Incorrect knowledge is judged to be most harmful (See Appendix H).

The participants' responses to the questionnaire were recorded as given for each question of the appropriate series. After each knowledge questionnaire item was administered, the response score that best described the participant's answer was circled. This judgment was guided by clinical judgments and the examples of correct responses in the manual (See Appendix I). When several responses on one scale required scoring, the group of responses were evaluated as a whole.

After consultation with one of the test authors (Barbara Horn, personal communication, August, 1986), for data analysis purposes, a numerical value was assigned to the response choices. Correct responses were assigned a value of 1, partially correct responses were assigned a value of 0.5, and incorrect responses were assigned a value of 0.

The State-Trait Anxiety Inventory

The State-Trait Anxiety Inventory (STAI) developed by Spielberger et al. (1983) is comprised of two self-report scales measuring two distinct anxiety concepts: state anxiety (S-Anxiety) and trait anxiety (T-Anxiety). According to Spielberger et al., transitory or state anxiety level is high in circumstances perceived as threatening, such as recovering from CABG surgery, and relatively low in situations of little or no danger. However, trait anxiety, referring to relatively stable individual differences in anxiety proneness, should not be influenced by situational stress. Further, persons high in T-Anxiety apparently do not respond to physical dangers such as imminent surgery (Auerbach, 1973; Spielberger, Auerbach, Wadsworth, Dunn, & Taulbee, 1973) different from persons with low T-Anxiety.

One of the objectives of this study was to determine CABG surgical patients' anxiety level in response to recovering from surgery. Consistent with the assumptions of trait-state anxiety theory, S-Anxiety and not T-Anxiety, was measured in this study. Specifically, the investigator hypothesized that CABG surgical patients' S-Anxiety was induced by recovery from

CABG surgery, recommended life style changes, and fear of complications or death. The participants indicated (marked) how they felt at a particular moment in time on the 20-item S-Anxiety scale.

Research with the STAI. The STAI has been used extensively in research and clinical practice in a variety of disciplines. More than 2000 studies using the STAI have appeared in the research literature since the test was published (Spielberger et al. 1970). Over a decade ago, Smith and Lay (1974) published an annotated bibliography of research concerned with, or related to, the State-Trait conception of anxiety. Approximately 150 references were listed including journal articles, doctoral dissertations, and technical reports; the STAI was used to measure anxiety in 108 of the studies. Over the past decade the STAI has been used more extensively in psychological research than any other anxiety measure (Buros, 1978), and, in most applications, STAI scores have been interpreted as unidimensional measures of state and trait anxiety (Spielberger et al., 1983).

Although most studies with the STAI have been conducted by psychologists or medical researchers, the inventory has also been widely used by investigators from other disciplines: counseling and guidance, criminal justice, education, nursing, physical education and sports psychology, and speech and hearing (Spielberger et al., 1983, p. 20). The STAI has been used extensively to investigate the role of anxiety in patients suffering from asthma (Alexander, 1972), headaches

(Hart, 1982), insomnia (Carr-Kaffashan & Woolfolk, 1979), and hypertension and CAD (Bloom, 1979; Rosenman & Chesney, 1980). Further, the STAI was used to assess anxiety in seven of nine intervention studies designed to modify Type-A behavior (Suinn, 1982).

In a meta-analysis of 102 and 68 studies examining the effects of psycho-educational interventions with surgical patients, Devine and Cook (1986) and Hathaway (1986) found the S-Anxiety scale frequently used to indicate psychological well-being. More recently, Lewis, Gadd, and O'Connor (1987) examined the S-Anxiety level of 90 sophmore nursing students at two time intervals, namely, before orientation and first clinical day in medical/surgical nursing. There was a significant difference between the group having their first laboratory 1 week after orientation (n = 51) and the group having their first laboratory the day following orientation (n = 39); the first group was more anxious than the latter.

The S-Anxiety scale is considered a sensitive indicator of changes in transitory anxiety experienced by clients and patients in counseling, psychotherapy, and behavior-modification programs (Spielberger et al., 1983). The scale has been used extensively to assess S-Anxiety induced by stressful experimental procedures and by unavoidable real life stressors such as imminent surgery, dental treatment, job interviews or important school tests. The sensitivity of the S-Anxiety scale to environmental stress was demonstrated in research on emotional reactions to

surgery. The S-Anxiety scores rose immediately prior to as well as after surgery (Auerbach, 1973). In contrast, T-Anxiety scores were the same before and after surgery, apparently not influenced by the stress of the surgical procedures. Logically, the S-Anxiety scale was deemed appropriate for examining the CABG surgical patient's response to the home convalescent phase of illness.

Reliability. The reliability of the STAI has been examined through the methods of test-retest correlation, measures of internal consistency using the Cronbach modified K-R 20 formula, and item remainder correlations. Test-retest correlation coefficients on the S-Anxiety scale were relatively low ranging from .16 to .54; however, on the T-Anxiety scale the test-retest correlation coefficients were relatively high ranging from .73 to .86.

Given the transitory nature of S-anxiety, measures of internal consistency such as the alpha coefficient provide a more meaningful index of the reliability of S-Anxiety scales than test-retest correlations. All but one of the S-Anxiety alphas reported by Spielberger et al. (1983) were above .90 for the samples of working adults, students, and military recruits, with a median coefficient of .93. The measures of internal consistency yielded reliability coefficients ranging from .83 to .92 for the T-Anxiety scale.

Alpha reliability coefficients were typically higher for the S-Anxiety scale when given under conditions of psychological stress. For example, the alpha reliability of

the S-Anxiety scale was .92 when administered to a group of college males immediately after a difficult intelligence test and .94 when given immediately after a distressing film (Spielberger et al., 1983, p. 14). For the same subjects, the alpha reliablity was .89 when it was given following relaxation training. Additional evidence of reliability was provided through obtaining median item-remainder correlations for various norm groups ranging from .55 to .63 on the S-Anxiety scale, and from .52 to .57 on the T-Anxiety scale. Spielberger and his co-workers (1983) concluded that:

> Stability, as measured by test-retest coefficients, is relatively high for the STAI T-Anxiety scale and low for the S-Anxiety scale, as would be expected for a measure assessing changes in anxiety resulting from situational stress. The internal consistency for both the S-Anxiety and the T-Anxiety scales are quite high as measured by alpha coefficients and item-remainder correlations. The overall median alpha coefficients for the S-Anxiety and T-Anxiety scales for Form Y in the normative samples are .92 and .90 respectively. (P. 14)

Validity. The concurrent validity of the T-Anxiety scale was examined by comparison with several other anxiety scales. The correlation coefficients between the T-Anxiety scale and: (1) the Institute for Personality and Ability Testing (IPAT)

Anxiety Scale by Cattell and Scheir (1963) were between .75 and .77; (2) the Taylor Manifest Anxiety Scale (TMAS) (Taylor, 1953) were between .79 and .83; and (3) The Zuckerman Affect Adjective Checklist (AACL) (Zuckerman, 1960) were between .52 and .58.

Spielberger et al. (1983) established construct validity of the S-Anxiety Inventory through administering it to 977 undergraduate students using the standard instructions under both normal conditions and examination conditions. Under normal conditions the male students (n = 332) scored 40.02 and under the exam conditions 54.99; the female students (n = 645) scored 39.36 and 60.51, respectively. Under these two conditions, the critical ratio between males was 24.14 and the point-biserial correlation between the two measures was .60. The critical ratio between females was 42.13 and the point-biserial correlation was .73. Both of the critical ratios and correlation coefficients were statistically significant. Spielberger et al. reported correlations between the S-Anxiety and T-Anxiety scales ranging from .61 to .75 using various groups of subjects under a variety of situations.

Selection and Training of Research Assistants

Because clinical nursing judgments were required, only registered nurses with a minimum of 2 years cardiovascular nursing experience were chosen as research assistants. This level of experience was chosen to assure satisfactory interrater reliability. The research assistants were informed

of the purpose and plan of the study as well as the purpose for establishing interrater reliability. In addition, research assistants were required to review the instrument and become familiar with the correct answers.

Interrater reliability was examined because observer influence could potentially contribute to measurement errors of the interview administered knowledge test. These errors could result from transient personal factors associated with the observer, variations in administration of the instrument, lack of instrument clarity, or differences in observer knowledge (Giovannetti, 1981, p. 158). Therefore, to enhance the reliability of the collected data, interrater reliability trials were conducted throughout the study.

During the pilot study, consisting of 5 CABG surgical patients, as well as during questionnaire administration to 15 main study participants, 5 at the beginning of the study, 5 midway through the study, and 5 at the end of the study, the same 2 specially trained research assistants silently recorded and scored the participant responses at the same time as the principal investigator. Using the same two research assistants decreased the within rater variability, maximizing the ability to detect differences between the raters. With the exception of the 5 pilot study participants, the investigator and the research assistants were blind to the participants' group assignment. Interrater reliability estimates were calculated using the one-way repeated analysis of variance (ANOVA) model (Polit & Hungler, 1983; Shelley, 1984; Kerlinger, 1986).

Because the results of this study could potentially influence clinical decisions about patient care, reliabilities of at least .90 were deemed acceptable.

Data Collection Procedures

The investigator completed a biographical data sheet (See Appendix J) for each patient agreeing to participate in the study after the informed consent form was signed (See Appendix K). Biographical data was obtained from the participant as well as the medical record. The nursing staff were provided with a form on which to record data obtained from telephone calls made by the participants (See Appendix L), and the participant was given a form on which to record telephone calls made to the various health care professionals (See Appendix M). The participant was asked to record their question or concern, who was called, what advice was offered, and their satisfaction with the advice. The knowledge test and the S-Anxiety Inventory were administered 6 to 7 weeks after hospital discharge. This took place in a quiet, comfortable room adjacent to the cardiovascular surgeons' offices, located across the street from the study hospital.

After hospital discharge and before the initial supportive-educative telephone call, the CRNS randomly assigned participants to either an experimental or a control group. The principal investigator provided the CRNS with 74 sealed envelopes, 37 containing instructions to place the participant in the experimental group and 37 specifying that participants ought to be placed in the control group, and

thus, not telephoned. After thoroughly mixing the 74 envelopes several times, the CRNS placed them in a locked cabinet. Each time a patient consented to participate in the study, the participant's name was given to the CRNS, who then randomly selected an envelope from the pile and inserted the participant's name in that envelope. It is re-emphasized that both groups received the CRNS's name and telephone number at work as well as the number of the cardiologist, the cardiovascular surgeon, the emergency department, the surgical nursing floor, and the dietician. The participant was encouraged to call the appropriate number should any concerns or questions arise. A record was kept of all telephone calls made by both the control and the experimental group participants to the various health professionals for purposes of data analysis and interpretation. In addition, all participants were informed, prior to hospital discharge, that if they were assigned to the telephone program the CRNS would contact them by telephone four to six times for 6 weeks, beginning within 1 week following hospital discharge, on a mutually agreed upon day and time.

Both experimental and control group participants completed the knowledge test as well as the S-Anxiety Inventory upon return to the cardiovascular surgeons' office at the prearranged appointment date. The principal investigator, blind to the participant's group assignment, conducted the posttest interviews and administered the S-Anxiety Inventory. Two research assistants acted as

observers during interrater reliability testing trials of 15 posttest interviews. Each interview lasted approximately 35-45 minutes. All interviews were tape recorded to minimize written recording and permit review once all posttests were marked and tabulated.

On the recommendation of Spielberger et al.(1983), the S-Anxiety Inventory was presented to the study participants as the Self-Evaluation Questionnaire, decreasing possible sensitivity to the word anxiety. The S-Anxiety Inventory, designed to be self-administered, was given individually to each participant without a set time limit for completion. Complete instructions for the S-Anxiety scale are printed on the test form. The instructions were read aloud to make sure the participants understood that they were required to report their feelings about their illness and convalescence, an understanding critical to the validity of S-Anxiety measurement.

Participants were encouraged to raise questions. Similarily, to facilitate objective responses, participants were reassured of the confidentiality of the test results. Clinical and research findings suggest that the distorting effects of adverse test-taking attitudes are a minor problem if sufficient care is taken to obtain participants' cooperation and trust when the inventory is administered (Spielberger et al., 1983). The participants generally required 6 to 10 minutes to complete the S-Anxiety scale.

In responding to the S-Anxiety scale, participants

blackened the number on the standard test form to the right of each item-statement best describing the intensity of their feelings: (1) not at all; (2) somewhat; (3) moderately so; and (4) very much so. On the S-Anxiety scale items 1, 2, 5, 10, 11, 15, 16, 19, and 20 are reversed. This reversed pattern was devised by Spielberger et al. (1983) to reduce the influence of an acquiescence set. Scores for the S-Anxiety scale can vary from a minimum of 20 to a maximum of 80. To obtain scores for the S-Anxiety scale, the weighted scores for the 20 items of the scale were added, recognizing that the scores for the above items are reversed. A template key was used for scoring the scale manually.

Pilot Study Procedures

Once the criteria for ethical approval were met, a pilot study was conducted. The pilot study provided an opportunity for detecting inadequacies and unforseen problems before implementing the full-scale study. The pilot study involved five patients who met the main study sample criteria. The pilot study addressed the following issues:

1. The time required by the participant to complete the instruments;
2. The instructions for the instruments;
3. The language of the instruments;
4. The ease of administering the instruments;
5. The participant recruitment procedures;
6. The participants' perception of the utility of the supportive-educative telephone program;

7. The participant attrition rate;
8. The time required for data collection of 5 participants;
9. The opportunity for researcher experience with the participants, methodology, and research instruments.

Five CABG surgical patients, potential participants, were approached by the investigator 2 to 3 days prior to hospital discharge and asked to participate in the pilot study after receiving a detailed description of the purpose and objectives. Upon agreement to participate, an informed consent form was signed. All five patients were allocated to the experimental group. Once discharge teaching had been completed by the health care professionals, all participants were provided with the telephone numbers of the cardiovascular surgeon, the cardiologist, the surgical nursing floor, the CRNS, and the dietician. The participants were encouraged to contact the appropriate professional should any questions emerge. Prior to hospital discharge, the investigator made an appointment for the 6 week surgical assessment, convenient for both the cardiovascular surgeon and the participant.

The supportive-educative telephone program, implemented by the CRNS, was delivered to each pilot study participant. Six to 7 weeks after hospital discharge, following the completion of the surgical assessment, the S-Anxiety Inventory and the knowledge questionnaire were administered by two specially trained research assistants and the principal investigator. Complete data were collected for 5 participants at the end of the seventh week of the pilot study.

In the first week of implementation of the pilot study five patients agreed to participate. The participants required between 35 and 60 minutes to complete the data collection tools. All study participants found the language and the instructions of the knowledge questionnaire and the S-Anxiety Inventory easily understandable. All participants perceived the supportive-educative telephone program as beneficial to their recovery. Moreover, family members expressed gratitude for the comprehensive follow-up of their loved one.

The pilot study identified two unforseen problems in the proposed study. After consulting the thesis committee members and assessing the pilot study data, two revisions of the originally planned methods and procedures were necessary. First, the principal investigator received frequent calls from the pilot study participants, presenting a potential for experimenter bias in the full-scale study. Therefore, the principal investigator's home telephone number on the informed consent form was replaced with the CRNS's telephone number. Second, the cardiovascular surgeons do not routinely schedule appointments more than 3 weeks in advance. Therefore, all participants in the main study were instructed to make an appointment for the 6 week follow-up assessment during the third week of the home convalescent period.

Data Analysis

A repeat measures ANOVA was computed to examine the interrater reliability of the three raters scoring the knowledge tests of 15 participants. Descriptive statistics

including the mean, standard deviation, minimum and maximum values were computed for the following variables: age, number of CABGs, total knowledge score, six subtest scores, anxiety score, number of medications, number of rehospitalizations, and the number of calls made to the various health care professionals. Frequency counts and percentages were calculated for the following variables: gender, age, marital status, geographic location of home, education level, occupational status, employment status, number of CABGs, number of previous MIs, previous participation in a cardiac rehabilitation program, performance of an exercise tolerance test and knowledge of the outcome of this test, number of calls made to health care professionals, number of medications, and rehospitalization rate.

Next, to determine the effectiveness of randomization, the experimental and control groups were analyzed for equivalence by computing independent t-tests to detect differences in means for age, number of CABGs, previous MIs, the number of calls made to various health care professionals during the home convalescent period, number of prescribed medications, and rehospitalization rate. Nominal data of the experimental and control groups were analyzed for equivalence using chi-square tests. Nominal data included gender, geographic location of home, prior experience with a cardiac rehabilitation program, performance of an exercise tolerance test, and knowledge of the outcome of this test. The following variables were collapsed into fewer categories to

permit chi-square analysis: marital status, education level, and employment status. Scattergrams of the relationship between knowledge and anxiety was constructed for the total sample and each group separately.

A nondirectional t-test at a significance level of .05 was used to examine group differences in knowledge levels. The independent t-test was also used to compare experimental and control group S-Anxiety scores. The t-test was chosen for data analysis because it is robust with respect to violations of the assumptions of normality and homogeneity of variance (Kerlinger, 1986, p. 287). The t-test is legitimate for analysis of the ordinal data of psychological and educational scales because most of these approximate interval equality fairly well (Kerlinger, 1986, p. 403). Finally, a pearson product moment correlation coefficient was calculated to test the relationship between the participants' level of knowledge and level of anxiety.

CHAPTER IV

Results

This chapter presents the interrater reliability data, a description of the sample characteristics, and the research hypotheses testing data. Descriptive data are divided into demographic data, personal supportive data, and environmental data. Hypotheses testing data are based on information obtained from the S-Anxiety Inventory and the knowledge questionnaires completed by the study participants.

Interrater Reliability

Interrater reliability was examined periodically throughout the research project: at the beginning, half-way through the project, and at the end of the data collection period. Two specially trained research assistants and the principal investigator administered the knowledge questionnaire to 15 participants; five participants in each reliability testing trial. All knowledge questionnaires were administered by the principal investigator using an interview format which took place in a private, comfortable room in a medical office complex near the study hospital. The four cardiovascular surgeons' offices are located in or very near this building, a convenient location for the participants. The two research assistants were seated at the far end of the room, in opposite corners, directly facing the participant and the principal investigator. The research assistants remained silent throughout the interview and scored the participant responses on individual knowledge questionnaires identical to

that used by the principal investigator. Upon completion of each knowledge test, the score sheets were placed in a brown envelope which was then sealed. The length of each of 15 participant interviews ranged from 35 to 60 minutes. All 15 participants selected for interrater reliability testing returned for their 6 week surgical follow-up.

Using a single factor ANOVA with repeated measures, the interrater reliability of the three raters scoring the knowledge test was computed. The mean total knowledge score of each rater differed by 0.4 of a point, a minuscule difference (See Table 2). An alpha of 0.99 indicated that the differences between the raters were very systematic or consistent. Further, rater 1 and rater 3 differed in only 4 of the 15 cases and rater 3 consistently scored higher than rater 1. There were significant differences between raters on the total knowledge scores ($p = .024$) perhaps because this composite score included all six subtest scores. Accuracy increases as the number of instrument items increase; that is, the instrument is more sensitive to differences. However, differences between the 3 raters on any of the 6 subtests were not statistically significant (See Tables 3 through 8). The mean interrater reliability estimates for the 3 raters ranged from .95 to .99. Thus, if the study were repeated with a different random sample of 3 raters but with the same participants the correlation between the mean ratings obtained from the second set of raters would be approximately .95 to .99.

Table 2

Reliability Analysis - Scale (Total)

Total Score	Mean	Standard Deviation	Cases
Rater 1	64.20	6.13	15.0
Rater 2	64.57	6.38	15.0
Rater 3	64.63	6.19	15.0

Analysis of Variance Table

Source of Variance	Sum of Squares	df	Mean Squares	f	p
Between raters	1625.20	14	116.23	4.26	.0242
Within raters	7.00	30	0.23		
Repeat measures	1.63	2	0.82		
Residual	5.34	28	0.19		
Total	1634.20	44	37.14		
Grand mean	64.46				

	Single Measure	Mean of Measures
Unadjusted Reliabilities	0.99	0.99
Adjusted Reliabilities	0.99	0.99

Note. Maximum score = 70

Table 3

Reliability Analysis - Scale (CAD*)

CAD Subtest	Mean	Standard Deviation	Cases
Rater 1	10.63	0.79	15.0
Rater 2	10.67	0.79	15.0
Rater 3	10.70	0.73	15.0

Analysis of Variance Table

Source of Variance	Sum of Squares	df	Mean Squares	f	p
Between raters	24.66	14	1.76		
Within raters	0.34	30	0.01	1.44	.2548
Repeat measures	0.03	2	0.02		
Residual	0.30	28	0.01		
Total	25.00	44	0.57		
Grand mean	10.66				

	Single Measure	Mean of Measures
Unadjusted Reliabilities	0.98	0.99
Adjusted Reliabilities	0.98	0.99

Note. Maximum score = 11
*CAD = Coronary Artery Disease

Table 4

Reliability Analysis - Scale (Diet)

Diet Subtest	Mean	Standard Deviation	Cases
Rater 1	13.43	0.90	15.0
Rater 2	13.47	0.90	15.0
Rater 3	13.43	0.90	15.0

Analysis of Variance Table

Source of Variance	Sum of Squares	df	Mean Squares	f	p
Between raters	34.44	14	2.46	1.05	.3631
Within raters	0.17	30	0.01		
Repeat measures	0.01	2	0.00		
Residual	0.16	28	0.00		
Total	34.61	44	0.78		
Grand mean	13.44				

	Single Measure	Mean of Measures
Unadjusted Reliabilities	0.99	0.99
Adjusted Reliabilities	0.99	0.99

Note. Maximum score = 14

Table 5

Reliability Analysis - Scale (Medications)

Medication Subtest	Mean	Standard Deviation	Cases
Rater 1	18.20	3.72	15.0
Rater 2	18.30	3.83	15.0
Rater 3	18.30	3.74	15.0

Analysis of Variance Table

Source of Variance	Sum of Squares	df	Mean Squares	f	p
Between raters	593.96	42	14.42		
Within raters	1.34	30	0.04	1.10	.3455
Repeat measures	0.97	2	0.05		
Residual	1.24	28	0.04		
Total	595.30	44	13.53		
Grand mean	18.26				

	Single Measure	Mean of Measures
Unadjusted Reliabilities	0.99	0.99
Adjusted Reliabilities	0.99	0.99

Note. Maximum score = 21

Table 6

Reliability Analysis - Scale (PAR*)

PAR Subtest	Mean	Standard Deviation	Cases
Rater 1	7.17	0.90	15.0
Rater 2	7.30	0.90	15.0
Rater 3	7.27	0.79	15.0

Analysis of Variance Table

Source of Variance	Sum of Squares	df	Mean Squares	f	p
Between raters	30.14	14	2.15		
Within raters	1.66	30	0.05		
Repeat measures	0.14	2	0.07	1.33	.2808
Residual	1.52	28	0.05		
Total	31.81	44	0.72		
Grand mean	7.24				

	Single Measure	Mean of Measures
Udjusted Reliabilities	0.93	0.97
Adjusted Reliabilities	0.93	0.97

Note. Maximum score = 8
*PAR = Physical Activity Restrictions

Table 7

Reliability Analysis - Scale (Exercises)

Exercise Subtest	Mean	Standard deviation	Cases
Rater 1	8.70	0.45	15.0
Rater 2	8.70	0.45	15.0
Rater 3	8.77	0.42	15.0

Analysis of Variance Table

Source of Variance	Sum of Squares	df	Mean Squares	f	p
Between raters	7.61	14	0.54		
Within raters	0.66	30	0.02		
Repeat measures	0.04	2	0.02	1.00	.3807
Residual	0.62	28	0.02		
Total	8.27	44	0.19		
Grand mean	8.72				

	Single Measure	Mean of Measures
Unadjusted reliabilities	0.89	0.96
Adjusted Reliabilities	0.89	0.96

Note. Maximum score = 9

Table 8

Reliablity Analysis - Scale (Rest)

Rest Subtest	Mean	Standard Deviation	Cases
Rater 1	6.07	1.12	15.0
Rater 2	6.13	1.14	15.0
Rater 3	6.17	1.01	15.0

Analysis of Variance Table

Source of Variance	Sum of Squares	df	Mean Squares	f	p
Between raters	48.91	14	3.49		
Within raters	1.16	30	0.04		
Repeat measures	0.08	2	0.04	1.00	.3801
Residual	1.08	28	0.04		
Total	50.08	44	1.14		
Grand mean	6.12				

	Single Measure	Mean of Measures
Unadjusted Reliabilities	0.97	0.98
Adjusted Reliabilities	0.97	0.99

Note. Maximum score = 7

Study Results

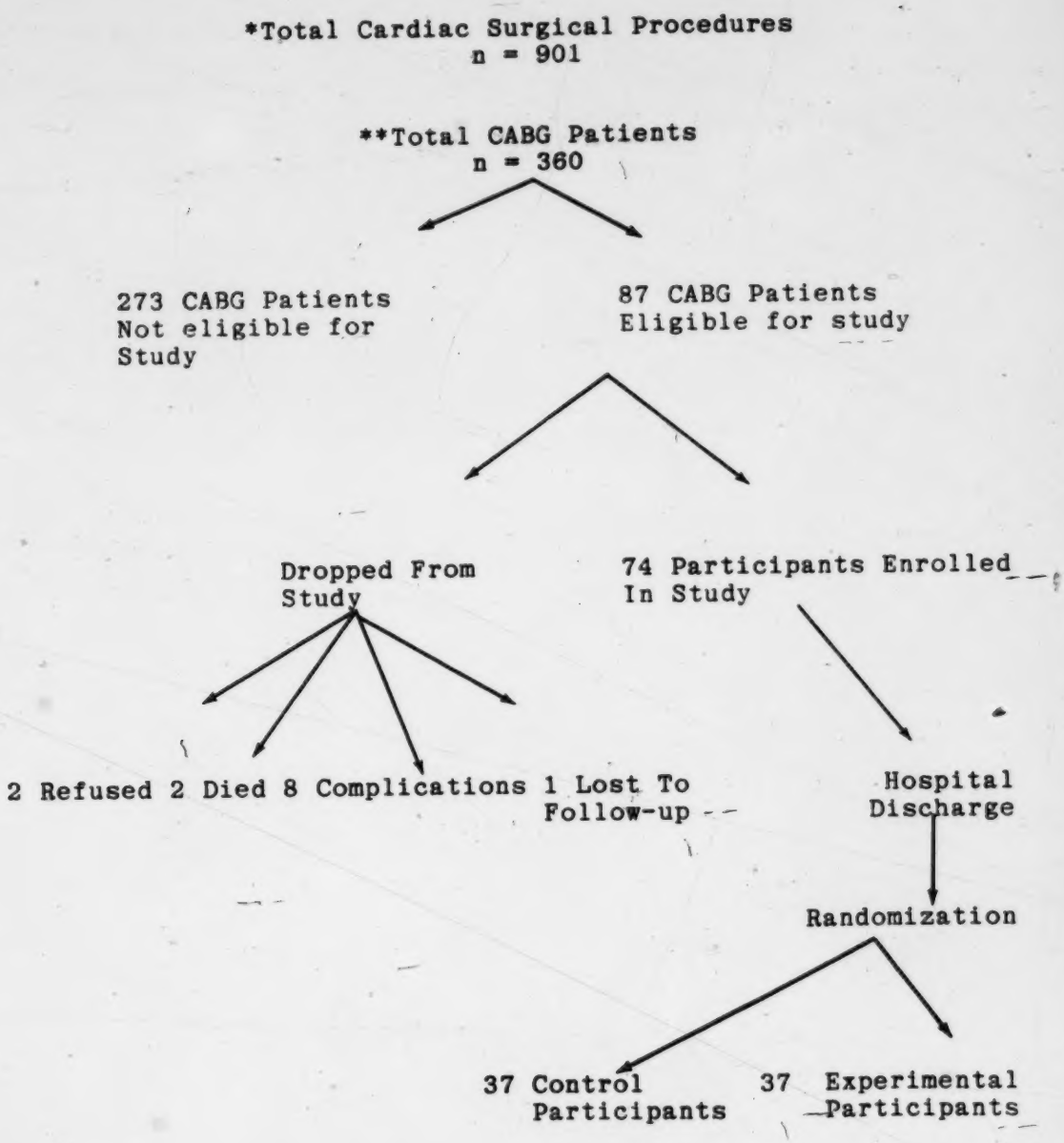
The sample characteristics discussed include group assignment and attrition rate, demographic data, and supportive data. The supportive data are further divided into personal and environmental data. This is followed by a description of the group differences of the knowledge and anxiety scores and the relationship between knowledge and anxiety, both for the sample as a whole and for each group separately.

Sample Characteristics

During the designated data collection period, 360 CABG surgical procedures were performed by four cardiovascular surgeons. Of these patients, 273 were not eligible for participation in the study for various reasons including previous cardiac operations, emergency status, and combined cardiac surgical procedures (See Table 9). Of the 87 patients meeting the specified criteria for participation, 2 patients refused to participate in the research project. Additionally, 2 patients died in hospital and 8 patients developed complications requiring prolonged hospitalization. One patient could not be contacted the first week after hospital discharge. Thirty seven participants were assigned to the experimental group and 37 participants were assigned to the control group. Complete data was obtained for all 74 participants by March 1987.

Table 9

Sampling Procedure and Attrition Rate



Note.

* - Between January 1, 1986 and June 19, 1987

**- Between September 11, 1986 and February 2, 1987

Demographic Data. Most of the study participants were married (81.1%) males (86.5%), between the ages of 50 and 70 years (70%). Over half were employed (58.1%), white collar workers (52.9%) living in rural homes (56.8%), and most (79.7%) had received 10 or more years of formal education. A small majority (52.7%) had never suffered an MI and a sizable majority had never attended a cardiac rehabilitation program.

Both groups comprised proportionately more males than females, consistent with the pattern of CAD in North America. The experimental group was composed of 30 males and 7 females; the control group, 34 males and 3 females (See Table 10). The mean age of the experimental group was 58 years with a standard deviation of 8.85 and a median age of 60 years. The mean age of the control group was 55.78 years with a standard deviation of 9.88 and a median age of 55 years. The groups were statistically equivalent in mean age ($p = .313$) and gender distribution ($p = .174$).

Most of the experimental (73%) and control group (89.2%) participants were married. Widowed participants represented 5.4% of both groups. More experimental group participants (13.5%) were living in a common law relationship than control group (2.7%) participants. The control group comprised 1 single male. The groups were statistically equivalent when the number of married and unmarried (single, widowed, and divorced) participants were compared ($p = .450$).

Less than half of the experimental group (45.9%) and the

control group (40.5%) participants lived in the city in which the study was conducted. A somewhat larger proportion of participants lived in rural areas of this western province, the Northwest Territories, or in the pacific coast province. However, the proportion of experimental and control group participants living in rural locations was statistically equivalent ($p = .389$).

The participants' education level was determined by the number of years of formal education each had received. This included years spent at a recognized vocational institution. Both groups comprised 5 participants with post-secondary education (See Table 10). Seven participants in the experimental group (18.9%) and 5 in the control group (13.5%) had received 6 to 8 years of formal education. Two participants in the experimental group (5.4%) and 1 in the control group (2.7%) had attended school for less than 6 years. Education level data were collapsed into three categories (8 years or less, 9 to 12 years, and 13 or more years) to permit statistical analysis; the difference between groups was nonsignificant ($p = .2166$).

The largest proportion of participants in both groups (18.9%) were represented in service occupations as outlined in Canadian census data (See Table 11). However, the control group comprised more participants (24.3%) in produce, assembling, or repairing occupations than the experimental group (16.2%). Five control group participants (13.5%) were in teaching and related occupations, primarily in post-secondary

institutions, compared to none in the experimental group. This is consistent with the larger proportion of control group participants with post-secondary education.

Employment status was determined by participant self-report at hospital discharge for all 74 participants; there were no changes 6 weeks later. A sizable majority of control group participants (67.6%) were employed compared to less than half of the experimental group (48.6%). Additionally, more experimental group (35.1%) than control group (24.3%) participants were retired. Similar percentages of participants were unemployed in each group -- 10.8% in the experimental and 8.1% in the control group. Two housewives in the experimental group did not work outside the home. Analyzing the data, regrouped into the categories of working and not working (unemployed, retired, and other), revealed equivalence between groups ($p = .099$).

Table 10

Selected Demographic Data Of The Study Sample

Characteristic	Experimental Frequency	%	Control Frequency	%
Sex				
Male	30	81.1	34	91.9
Female	7	18.9	3	8.1
($x^2(1) = 1.850$, $p = .1738$)				
Age				
30-39 years	0	0.0	2	5.4
40-49 years	7	18.9	9	24.3
50-59 years	10	27.0	12	32.4
60-69 years	18	48.6	12	32.4
70-79 years	2	5.4	1	2.7
Mean age	58.00		55.78	
Median age	60.00		55.00	
Range	40-76		38-79	
Standard deviation	8.854		9.883	
Modal age	46		47	
($t(72) = 1.02$, $p = .313$)				
Marital Status				
Single	0	0.0	1	2.7
Married	27	73.0	33	89.2
Widowed	2	5.4	2	5.4
Divorced	3	8.1	0	5.4
Common law	5	13.5	1	2.7
($x^2(1) = .561$, $p = .4540$)*				
Geographic Location of Home				
Rural	20	54.1	22	59.5
Urban	17	45.9	15	40.5
($x^2(1) = .220$, $p = .389$)				
Education				
Less than 6 years	2	5.4	1	2.7
6 - 8 years	7	18.9	5	13.5
9 - 10 years	11	29.7	13	35.1
11 - 12 years	12	32.4	7	18.9
13 - 16 years	3	8.1	5	13.5
17 years plus	2	5.4	6	16.2
($x^2(2) = 3.059$, $p = .2166$)**				

Note. * Data regrouped into married and unmarried.
** Data regrouped into 3 categories: less than 9 years, 9 -12 years, and 13 years plus.

Table 11

Selected Demographic Data of The Study Sample

Characteristic	Experimental Frequency	%	Control Frequency	%
Occupational Status				
Natural sciences, engineering, mathematics	2	5.4	2	5.4
Social sciences and related fields	1	2.7	1	2.7
Teaching and related fields	0	0.0	5	13.5
Medicine and health	0	0.0	2	5.4
Artistic, literary, and recreation	1	2.7	1	2.7
Clerical and related occupations	1	2.7	1	2.7
Sales occupations	2	5.4	2	5.4
Service occupations	7	18.9	7	18.9
Farming and animal husbandery	5	13.5	2	5.4
Forestry and logging	2	5.4	0	0.0
Mining, quarry, oil and gas field	1	2.7	1	2.7
Machining and related field	0	0.0	1	2.7
Product, assembling, repairing	6	16.2	9	24.3
Construction trade	3	8.1	2	5.4
Transportation equipment operating	1	2.7	1	2.7
Material handling	2	5.4	0	0.0
Other craft and equipment operating	1	2.7	0	0.0
Not elsewhere classified (housewife)	2	5.4	0	0.0
Employment Status				
Employed	18	48.6	25	67.6
Unemployed	4	10.8	3	8.1
Retired	13	35.1	9	24.3
Other (housewife)	2	5.4	0	0.0
($\chi^2(1) = 2.720$. $p = .0991$)*				

Note. * Data regrouped into 2 categories: working and not working.

Personal Supportive Data. Selected personal supportive data were obtained from the participant's self-report and the hospital chart. The majority of the experimental (72.9%) and the control group (70.2%) participants had three to four coronary vessels grafted (See Table 12). Two control group participants (5.4%) had seven vessels grafted. The mean number of grafted coronary arteries in the experimental (3.35) and control group (3.48) was statistically equivalent ($p = .600$).

Over half of the experimental (51.4%) and control group (54.1%) participants had never suffered an MI. Two of the experimental group participants (5.4%) had suffered three previous MIs. The mean number of MIs previously experienced by participants in the two groups was statistically equivalent ($p = .632$). A large majority of participants in both groups (78.4%) had never enrolled in a cardiac rehabilitation program. At the time of the administration of the knowledge questionnaire and the S-Anxiety Inventory only a few of the experimental (21.6%) and control group participants (29.7%) had performed an exercise tolerance test. Even fewer experimental (18.9%) and control group (27%) participants knew the outcome of this test. All participants in the experimental group with knowledge of their stress tests had negative tests, i.e., good results. Of the 10 control group participants aware of their stress test results, five tests were positive and five were negative.

Table 12

Selected Personal Supportive Data of The Study Sample

Characteristic	Experimental Frequency	%	Control Frequency	%
Number of Grafted Coronary Arteries				
1	2	5.4	0	0.0
2	4	10.8	7	18.9
3	14	37.8	13	35.1
4	13	35.1	13	35.1
5	4	10.8	2	5.4
6	0	0.0	0	0.0
7	0	0.0	2	5.4
Mean	3.35		3.48	
Standard Deviation	1.01		1.19	
Range	1 - 5		2 - 7	
($t(72) = -0.53$, $p = .600$)				
Previous Myocardial Infarctions				
0	19	51.4	20	54.1
1	15	40.5	14	37.8
2	1	2.7	3	8.1
3	2	5.4	0	0.0
Mean	0.62		0.54	
Standard Deviation	0.79		0.65	
($t(72) = 0.48$, $p = .632$)				
Prior Experience with Cardiac Rehabilitation				
No	29	78.4	29	78.4
Yes	8	21.6	8	21.6
($p = 1$)				
Exercise Tolerance Test Performed				
No	29	78.4	26	70.3
Yes	8	21.6	11	29.7
($x^2(1) = 0.632$, $p = .4247$)				
Patient Knowledge of Exercise Test Results				
No	30	81.1	27	73.0
Yes	7	18.9	10	27.0
($x^2(1) = 0.687$, $p = .4071$)				

Environmental Data. Significantly more control group participants than experimental group participants ($p = .000$) made telephone calls to the CRNS requesting information and/or expressing concerns (See Table 11). Eleven experimental group participants versus 31 control group participants made between one and three calls. None of the experimental group participants made more than three calls to the CRNS whereas 2 control group participants made four calls and 1 participant each made five, six, and, seven calls.

Twelve control group (32.4%) participants called their family doctor once compared to only 3 experimental group (8.1%) participants. Participants in both groups made few calls to their cardiovascular surgeon perhaps owing to the brevity of the relationship, that is, the limited time in which to establish rapport prior to surgery. Thirty six experimental (97.3%) and 25 control group (67.6%) participants never called their cardiovascular surgeon. However, 12 control group participants made between one and three calls to their surgeon versus 1 experimental group participant placing only one call. Four participants, 2 in each group, made one telephone call to the surgical nursing floor. This small number of calls is puzzling; either the calls were never placed, as indicated by reviewing the participant telephone call forms, or they were not recorded by the nursing staff.

A total of 87 calls were placed to the various health care professionals by 36 control and 13 experimental group participants. The 36 control group participants made 70 calls

to the health care professionals, 37 of which were directed to the CRNS. Thirteen experimental group participants placed 17 calls to the health care professionals; 11 called the CRNS, three called their family doctor and the CRNS, two called the surgical nursing floor, and one participant called the CRNS and the cardiovascular surgeon. The majority of the 87 telephone calls (79.0%) from the participants to the health care professionals were made in the first two weeks after their hospital discharge.

All study participants were taking at least one prescribed medication. Seven experimental (18.9%) and 6 control group (16.2%) participants were taking two medications. Fewer experimental (10.8%) than control group (24.3%) participants were taking three medications, however, more experimental (18.9%) than control group (5.4%) participants were taking four medications. Equal proportions of participants in both groups (13.5%) were taking between five and seven medications. The groups were statistically equivalent regarding the mean number of prescribed medications ($p = .517$).

Importantly, the groups differed significantly in the incidence of rehospitalization ($p = .022$). Nine control group participants (24.3%) were rehospitalized during their convalescent period compared to only 2 experimental group participants (5.4%). The reasons for rehospitalization were insufficient to warrant exclusion from the study (See Table 14).

Table 13
Selected Environmental Supportive Data of The Study Sample

Characteristic	Experimental Frequency	%	Control Frequency	%
Calls to Cardiac Rehabilitation Nurse				
0	26	70.3	1	2.7
1	6	16.2	7	18.9
2	4	10.8	13	35.1
3	1	2.7	11	29.7
4	0	0.0	2	5.4
5	0	0.0	1	2.7
6	0	0.0	1	2.7
7	0	0.0	1	2.7
($t(72) = -7.61$, $p = .000$)				
Calls to Family Doctor				
0	34	91.9	17	45.9
1	3	8.1	12	32.4
2	0	0.0	8	21.6
($t(72) = -4.88$, $p = .000$)				
Calls to Cardiovascular Surgeon				
0	36	97.3	25	67.6
1	1	2.7	7	18.9
2	0	0.0	3	8.1
3	0	0.0	2	5.4
($t(72) = -3.34$, $p = .002$)				
Calls to The Surgical Nursing Floor				
0	35	94.6	35	94.6
1	2	5.4	2	5.4
($p = 1$)				
Total Calls Made	17	19.5	70	80.5
Number of Medications Prescribed				
1	14	37.8	15	40.5
2	7	18.9	6	16.2
3	4	10.8	9	24.3
4	7	18.9	2	5.4
5	2	5.4	4	10.8
6	2	5.4	1	2.7
7	1	2.7	0	0.0
($t(72) = 0.65$, $p = .517$)				
Rehospitalization				
0	35	94.6	28	75.7
1	2	5.4	8	21.6
2	0	0.0	1	2.7
($t(72) = -2.36$, $p = .022$)				

Table 14

Reasons For Rehospitalization

Experimental Group	n	Control Group	n
Ulnar nerve compression	1	Inability to diagnose chest pain	5
Mild pulmonary edema	1	Medication adjustments/toxicity	2
		Shortness of breath/anxiety	2

Knowledge and Anxiety Scores of the Study Sample

The mean percent knowledge score for the sample as a whole was 85.81 with a standard deviation of 8.94 (See Table 15). Of a possible 70 points, the sample achieved a raw score mean of 60.07 with a standard deviation of 8.94 and a range of 30.5 to 69.5. The experimental group achieved a raw knowledge score mean of 67.73 with a standard deviation of 1.43 and a range of 63.5 to 69.0. The control group only achieved a raw score mean of 52.40 with a standard deviation of 6.28 and a range of 30.5 to 68.0. The experimental group mean percent correct knowledge score was significantly higher than the control group (p = .000).

The sample as a whole demonstrated a mean S-Anxiety score of 36.50 out of a possible 80 points with a standard deviation of 11.85. The experimental group mean S-Anxiety score was 29.78 with a standard deviation of 7.72 and a range of 20 to 40. The control group mean S-Anxiety score was 43.22 with a standard deviation of 11.52 and a range of 21 to 68. The control group mean S-Anxiety score was significantly higher than the experimental group (p = .000).

Non-directional, independent, t-tests were computed to determine mean differences on each of the six knowledge subtests scores (See Table 16). The experimental group achieved a significantly higher mean percent correct score on each subtest than the control group (p = .000). Again, significance at the .05 level was achieved when all subtest scores were combined into a total score, $t(72) = 14.47$, p = .000.

A pearson product moment correlation coefficient was computed using the mean percent correct total knowledge score and the mean S-Anxiety score for the 74 study participants (See Table 17). There was a substantial negative correlation (r = -.71, p = .000) between the level of knowledge and the level of anxiety for the total study sample. Each group was analyzed separately in a similar fashion. A statistically significant negative correlation (r = -.61, p = .000) between the control group participants' level of knowledge and level of anxiety was found; a similar relationship was found in the experimental group though somewhat less pronounced (r = -.30, p = .035).

Moreover, scattergrams of the knowledge levels and anxiety levels of each group separately as well as of the total sample more clearly illustrate the impact of the telephone program. Because randomization was effective in producing 2 equivalent groups on the selected demographic variables, theoretically, one can assume that both groups were equivalent in knowledge and anxiety levels prior to

implementation of the telephone program. This is illustrated by the scattergram of the control group (See Figure 1). The scattergram of the experimental group (See Figure 2), depicts the shift of the participants' knowledge scores up and their anxiety scores down after receiving the telephone program. Finally, the scattergram of the total sample illustrates two distinct groups after delivering the telephone program to the experimental group, clearly, illustrating the effectiveness of the program in reducing anxiety and increasing knowledge (See Figure 3). A second stage of analysis revealed that the relationship between the level of knowledge and level of education was nonsignificant for the control group participants (r = .114, p = .1968) but significant for the experimental group participants (r = .2986, p = .036). Further, the relationship between the participants' level of knowledge and age in years was nonsignificant in both the control group (r = .1824, p = .1398) and the experimental group (r = .-2616, p = .058).

Table 15

Knowledge and Anxiety Scores of The Study Sample

Variable	Cases	Mean	Standard Deviation	t	df	p
Mean Percent Knowledge Scores						
Total Group	74	85.81	8.94			
Experimental	37	96.76	2.04			
Control	37	74.86	8.97	14.47	72	.000
S-Anxiety Scores						
Total Group	74	36.50	11.85			
Experimental	37	29.78	7.72			
Control	37	43.22	11.52	-5.89	72	.000

Table 16

Independent T-Tests For Each of The Six Knowledge Subtests

Variable	Number Of Cases	Percent Mean	Standard Deviation	T Value	Degrees Of Freedom	p
CAD*						
Experimental	37	98.65	2.81	6.29	72	.000
Control	37	87.59	10.31			
Diet						
Experimental	37	98.65	3.89	5.62	72	.000
Control	37	83.88	15.49			
Medications						
Experimental	37	95.36	5.53	13.52	72	.000
Control	37	58.82	15.49			
PAR**						
Experimental	37	94.09	5.69	9.11	72	.000
Control	37	72.80	13.03			
Exercise						
Experimental	37	98.80	3.24	5.53	72	.000
Control	37	88.29	11.09			
Rest						
Experimental	37	94.60	7.97	8.92	72	.000
Control	37	70.46	14.40			
Total						
Experimental	37	96.76	2.04		72	.000
Control	37	74.86	8.97	14.47		

Note.

*CAD - Coronary Artery Disease

**PAR - Physical Activity Restrictions

Table 17

Pearson Product Moment Correlation Between Knowledge and Anxiety

	Total Sample	Experimental	Control
Correlation (r)	-0.71	-.30	-.61
Probability	.000	.035	.000

Figure 1. Scattergram of Knowledge and Anxiety of The Control Group

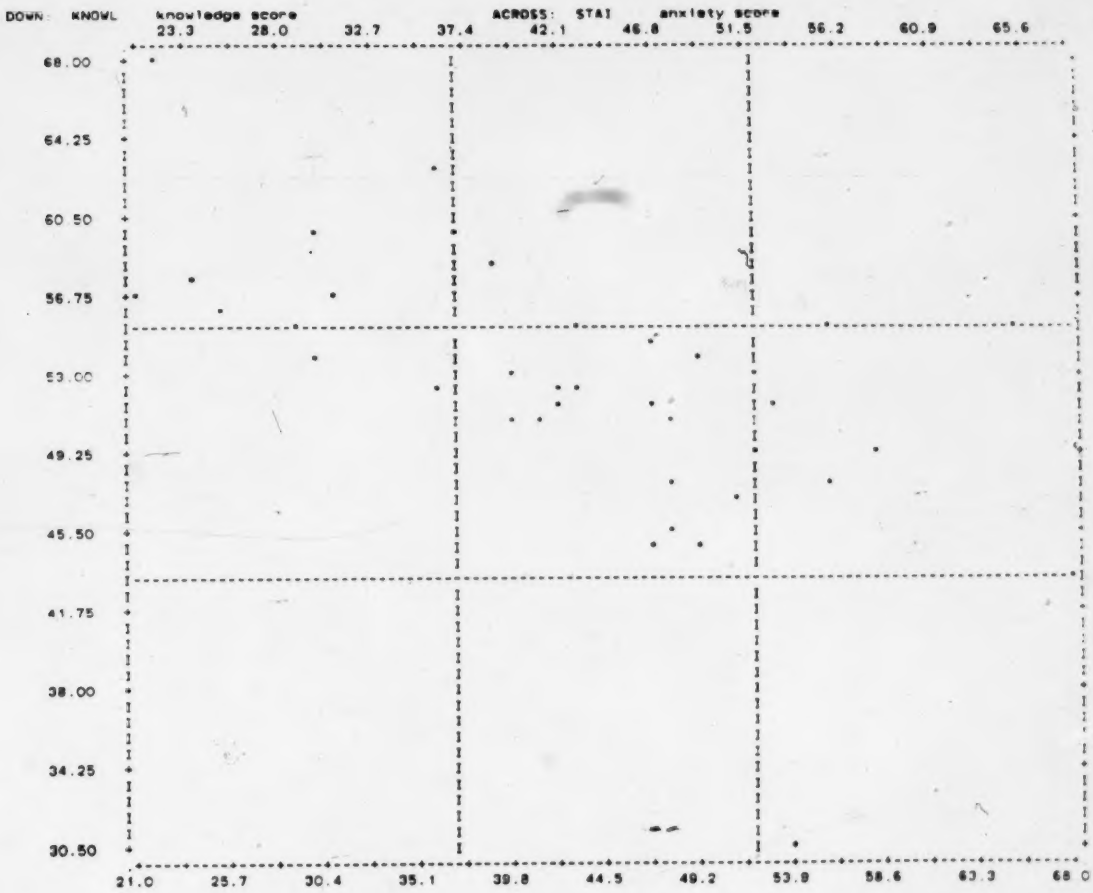


Figure 2. Scattergram Of Knowledge and Anxiety of The Experimental Group

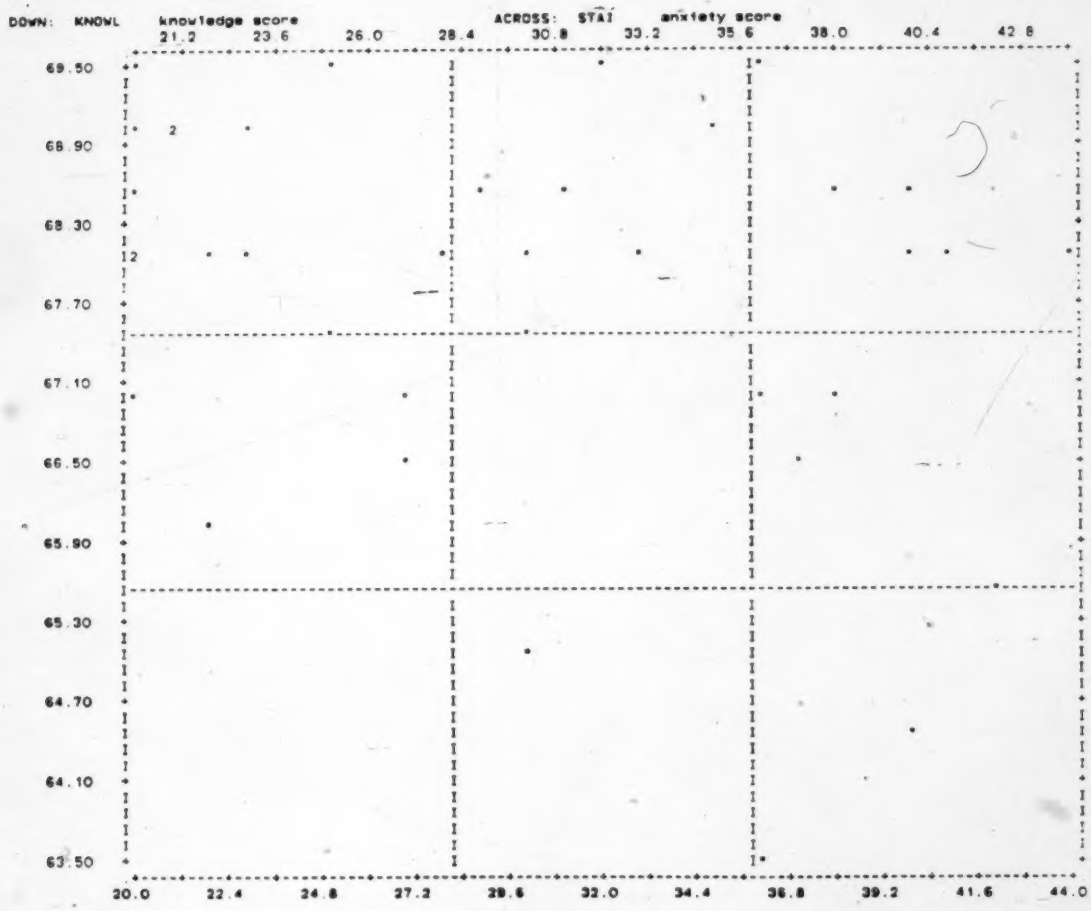
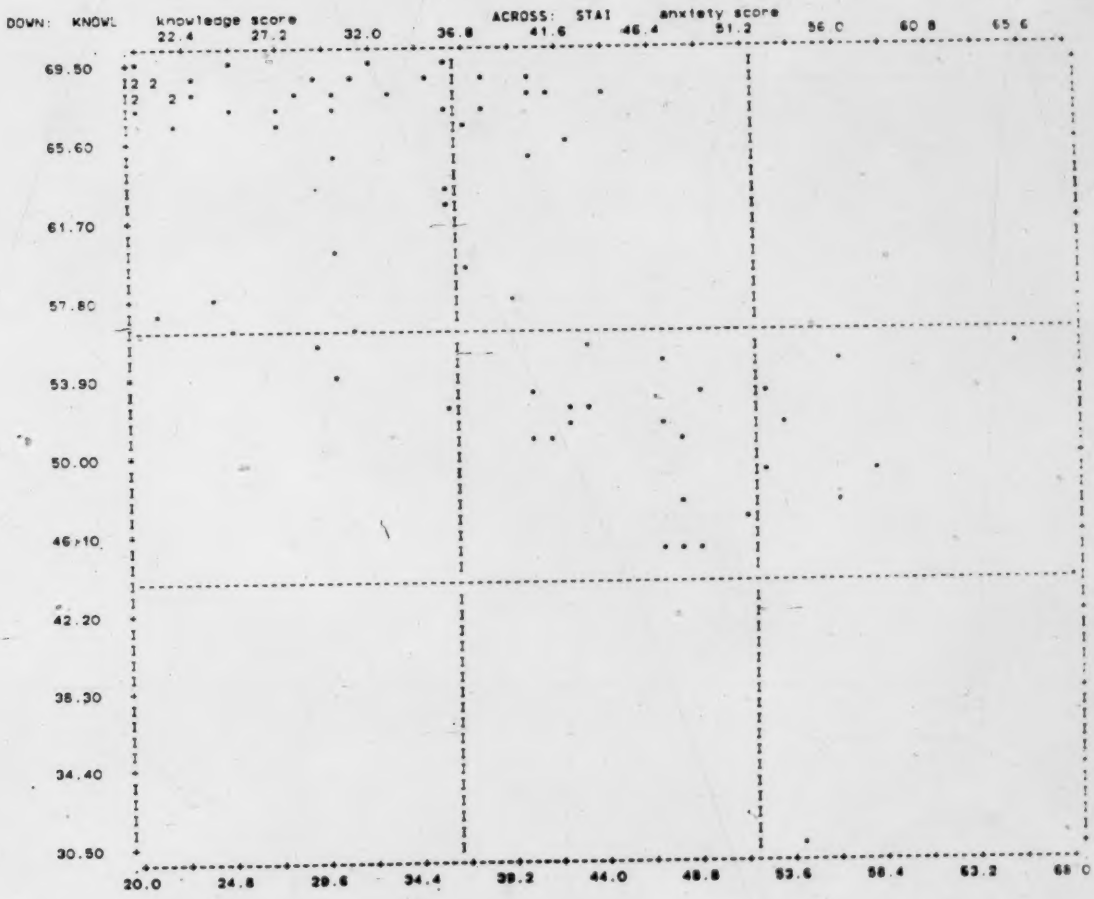


Figure 3. **Scattergram of Knowledge and Anxiety of The Total Sample**



CHAPTER V

Discussion and Recommendations

Discussion of Findings

The focus of this chapter is a discussion of the data, addressing each stated hypothesis. This includes the study participants' knowledge level in the six subtests and their state anxiety scores. Implications and recommendations for nursing are suggested in the areas of nursing practice, nursing administration, nursing education, and nursing research.

Knowledge Level In The Six Knowledge Subtests

CAD, Its Effects and Related Self-Care Measures. It was hypothesized that CABG surgical patients receiving the supportive-educative telephone program would achieve higher knowledge levels about CAD, its effects and related self-care measures than those not receiving the program. Significant group differences on this subtest supported the hypothesis, $t(72) = 6.29$, $p<.01$. All participants received in-hospital patient education from the health care personnel in preparation for hospital discharge. A variety of teaching aids including a series of five slide tapes, teaching manuals, and booklets were utilized to provide information about CAD, surgical treatment, and the recovery period. Teaching occurred in both structured and unstructured sessions as well as individual and group teaching sessions.

Because CABG surgical patients have a tremendous amount of information to learn and skills to master, it is naive to

assume that intensive in-hospital patient education will enable the patient to assimilate all the information in this limited available time period. Although one cannot deny the beneficial effects of the in-hospital education program, the data supporting hypothesis 1 demonstrated that the supportive-educative telephone program not only reinforced information that was provided in hospital but also provided new information needed by the participant throughout the early home convalescent period. The participants received consistent, progressive educational messages in a form they could assimilate and revise over a suitable time period.

This study supports the findings of Pozen et al. (1977) and Stevens (1985) who investigated the effects of telephone information provided to MI patients. The treatment groups in these studies received information in hospital in addition to telephone information provided by a nurse whereas the control groups received no telephone follow-up during this same time period. Both investigators found the treatment groups more knowledgable about the manifestations of a MI 1 month and 6 weeks, respectively, after hospital discharge than the control groups. Similarily, Owens et al. (1978) reported that in the early home convalescent period the knowledge level of cardiac patients about the causes of CAD increased but not significantly. Conversely, Christopherson and Pfeiffer (1980) and Finkbeiner (1979) found that the test items on anatomy, physiology, and the CAD process, generally, were answered incorrectly whereas test items on the patients' physical care

were answered correctly. Coombs (1984) found that out of five subtests, 105 CABG surgical patients performed the poorest on the CAD and heart surgery subtest. Coombs posited that the complexity of the content of this subtest probably contributed to the poor performance.

Following evaluation of in-hospital patient education programs, Scalzi et al. (1980) and Sivarajan et al., (1983) found that during hospitalization, patients' retention of information was limited, and deteriorated after hospital discharge. If knowledge is a necessary prerequisite for appropriate decision making and self-care behaviors of patients after hospital discharge then it is imperative that patients are equipped with the knowledge about their health deviation, its effects, and related self-care behaviors in order to achieve this end. The supportive-educative telephone program provided the experimental group participants with appropriate and timely information in the early home convalescent period.

Therapeutic Diet. As hypothesized, the experimental group demonstrated a greater knowledge level about therapeutic diet than the control group, $t(72) = 5.62$, $p<.01$. Of all the subtests, the experimental (98.6%) and the control group (83.9%) achieved the second and third highest scores, respectively, on the diet subtest 6 to 7 weeks after hospital discharge. Coombs (1984) found that of the five subtests administered, CABG surgical patients scored the highest on the diet subtest. Finkbeiner (1979) also found that MI patients

achieved the highest score on the diet subtest. Although Stevens (1985) found no significant difference between the experimental and the control groups' diet subtest, the mean score for the experimental group was higher than the control group on the posttest. Raleigh and Odtohan (1987) found that 2 months after hospital discharge the experimental group attained the best scores on the diet and medication tests. However, Steele and Ruzicki (1987) found that 38 CABG surgical patients incorrectly answered questions related to dietary changes and dining out. The researchers suggested that although the introduction of dietary information was appropriate for in-hospital patients, long-term behavior change could be managed and monitored more consistently in an outpatient setting.

In the present study, all participants and their mates attended a 1 hour group teaching session lead by a dietician who also provided individualized dietary instruction prior to hospital discharge. Participants were given a booklet outlining Canada's food guide as well as sodium, cholesterol, and fat dietary restrictions suggested by the American Heart Association. The dietician's telephone number was given to all participants.

The participants' relatively high levels of diet knowledge may be explained by the in-hospital educational program's emphasis on diet, prior knowledge of both the participant or mate, or the perceived relevancy of the information. Given that low cholesterol/low fat diets and low

salt/sodium diets have received considerable emphasis through mass media in the last few decades, it logically follows that continuous exposure and reinforcement may have led to retention of diet information. Additionally, media emphasis may have influenced the participants' perception of the relevance of this information by reinforcing the significant relationship between diet and CAD.

Patients are required to problem-solve and make decisions regarding diet daily, therefore, diet information is frequently applied and subsequently reinforced. The educational literature asserts that applying knowledge will positively influence retention. However, in the present study, reinforcement of knowledge through application alone fails to explain the significantly higher knowledge level in the experimental group than the control group. The supportive-educative telephone program apparently filled a gap in the patients' knowledge that had not been filled during hospitalization.

Prescribed Medications. The mean percent correct medication subtest score of the experimental group was 95.4% versus 58.8% for the control group with a standard deviation of 5.53 and 15.49, respectively. The large standard deviation of the control group reflects that whereas 3 participants had near perfect scores, 9 participants answered less than 50% of the questions correctly. All experimental group participants scored 70% or greater on the medication subtest. As hypothesized, the experimental group demonstrated a

significantly greater knowledge level about medications than the control group, $t(72) = 13.52$, $p<.01$.

The nursing staff of the study hospital provided information about medications including indications, therapeutic action, time of administration, and common side effects. Medication teaching to the CABG surgical patients began soon after their transfer from the cardiovascular intensive care unit to the surgical ward. The nurses were expected to inform the patients about the purpose and potential side effects of each medication when it was administered. Because the patients' prescriptions for the home convalescent period were written the day of hospital discharge, the majority of the medication teaching was delayed until that time. Particular emphasis was placed on the administration and side effects of the drug Asasantine, a frequently prescibed medication for CABG surgical patients. Because of the importance of taking cardiovascular medications correctly, participants were tested on all of the prescription medications. However, the principal investigator randomly selected only one medication for scoring purposes.

The control group demonstrated the lowest mean percent correct scores on the medication subtest 6 to 7 weeks after hospital discharge. The low scores achieved on the medication subtest may reflect the limited nursing time available for comprehensive medication teaching apart from providing quality nursing care. Furthermore, the medication knowledge deficit may be explained by the length and complexity of the content

of the subtest, lack of teaching emphasis placed on medication knowledge, or high patient anxiety levels which hampered knowledge retention during hospitalization. As well, the teaching booklets and film strips do not provide specific information about medications.

After hospital discharge, patients often forget medication information which is provided during hospitalization whether the teaching is structured or unstructured (Pozen et al., 1977; Scalzi et al., 1980; Curran, 1978; Finkbeiner, 1979; Stevens, 1985). Even with telephone follow-up Stevens (1985) failed to detect a significant difference between the experimental and control groups' level of medication knowledge. On the other hand, Raleigh and Odtohan (1987) found that patients scored highest on medication questions, however, the entire test consisted of only 26 items. Although the content and proportion of medication questions were not indicated, it is reasonably assumed that the medication questions were less comprehensive than the 21-item subtest used in the present study.

In the present study, control group participants, particularly, displayed disinterest in their medications, often delegating medication administration to their mate. This was especially true for participants complaining of memory lapses and fatigue. All control group participants for whom Digoxin had been prescribed could identify the medication but not the side effects or signs of toxicity; they were unaware of the necessity of determining their heart rate prior

to taking the drug. Moreover, 3 control group participants experienced nausea, vomiting, and dangerously slow and irregular heart rates at the 6 week surgical follow-up indicating Digoxin toxicity.

A large proportion of all study participants verbalized problems remembering the names, dosage, and side effects of their medications. Participants may have failed to perceive medication information as meaningful, believing only, in the need to follow physician orders without an understanding of the implications; moreover, they may have preferred to deny the importance of understanding their medications. Participants may have perceived limited independent control over medication decisions, relegating total responsibility to the health care providers or their mate. As well, the low mean percent score of the control group (58.8%) may reflect that, lacking reinforcement of medication information during the home convalescent period, participants failed to seek this type of information. Granted that medication self-administration requires little daily decision-making, except perhaps, whether or not to take the medication, one could argue that compared to content areas such as diet and exercise, medication knowledge involves little application and, therefore, less reinforcement.

Participants may have experienced information overload during hospitalization which inhibited prolonged retention. The opportunity for the experimental group participants to interact with a nurse after hospital discharge, at a time when

they were ready to learn, may have stimulated some participants to seek answers to specific questions. Marshall (1985) suggested that as patients and family adjust to the home environment they tend to have many questions. Medication knowledge may have been more meaningful for the experimental group participants during the home convalescent period. Discussions with the CRNS may have prompted participants to view medication knowledge as an important factor in the control of the CAD process.

Education of all cardiac patients about pharmacotherapy is the keystone to comprehensive education as nearly one-half of all prescription drugs are taken improperly (Wenger et al., 1986). Nicklin (1986) and Flynn and Frantz (1987) recommended patient follow-up via telephone calls to help identify problems soon after hospital discharge, potentially, decreasing unnecessarily prolonged and complicated recovery. In the present study, many experimental group participants implemented strategies suggested by the CRNS to plan their medication administration; they used memory aids such as taping their medication schedule to the television set in bold, bright letters.

Recommended Physical Activity Restrictions. Given the significantly greater knowledge level about recommended physical activity restrictions demonstrated by the experimental group than the control group, $t(72) = 9.11$, $p < .01$, hypothesis 4 was supported. The mean percent correct score for the experimental group was 94.08 with a standard

deviation of 5.69; for the control group, a mean percent correct score of 72.8 was attained with a standard deviation of 13.03. Seven control group participants achieved 87% or greater on this subtest whereas 2 participants achieved less than 50% of the correct responses, contributing to the large variance in the control group. Stevens (1985) found large variances in both the experimental and the control group on this subtest, however, a significant difference between the two groups was not found.

In the study hospital, information about necessary physical activity restrictions for CABG surgical patients was taught by the nursing and medical staff. The CRNS reinforced this information during a visit to each patient prior to hospital discharge. Additionally, the patient was sent home with a booklet (Burrows & Gassert, 1984) providing activity guidelines to follow at home. Examples of recommended activity restrictions included driving a car, mowing the lawn, moving furniture, and lifting more than 10 pounds.

The objective of the 8-item activity restrictions subtest was to determine the participants' level of knowledge about which activities to avoid or modify during the first 6 to 7 weeks at home. Further, the test assessed the participants' knowledge about the recommended time period for these restrictions as well as whether or not the participants could verbalize a plan for implementing necessary self-care behaviors in light of these restrictions.

The experimental group's higher mean percent correct

score on the activity restrictions subtest than the control group may reflect the influences of the relearning, reinforcement, and application principles provided by the CRNS via the telephone. Perhaps participants believed that knowing how to accurately implement activity restrictions, monitor progress, and adjust activities could prevent the appearance of somatic symptoms and concerns. Even so, of the six subtests, the experimental group participants performed the poorest on the physical activity restriction subtest. Marshall (1985) discovered a unique characteristic of the CABG population in cardiac rehabilitation programs; they expressed difficulty knowing which activities they could and ought to perform postoperatively. Murray and Beller (1983) found that even with relief of pain patients verbalized uncertainty about their limitations and fear of precipitating symptoms. Clearly, in the present study, the supportive-educative telephone program effectively addressed the CABG surgical patient's knowledge deficits and accompanying uncertainties about activity restrictions.

Recommended Exercises. Hypothesis 5 was supported as the experimental group demonstrated a greater knowledge level about recommended exercises than the control group, $t(72) = 5.53$, $p < .01$. The groups were equivalent in the proportion of participants with prior attendance in a cardiac rehabilitation program; group differences might have influenced the results. Both groups achieved the highest mean scores on the recommended exercises subtest indicating that all participants

found this information meaningful and necessary.

The usual recommended exercises for CABG surgical patients following hospital discharge is a progressive daily walking program. The CRNS and the health care team, in consultation with the participant's cardiologist, provided information concerning the walking program prior to hospital discharge. At hospital discharge all participants were provided with a booklet outlining the recommended activity progression. The experimental group received additional reinforcement of this information during the supportive-educative telephone calls, and necessary adjustments were made in individual exercise programs.

Oldridge (1986) concurs that immediately following hospital discharge, patients require specific directions concerning frequency, intensity, and type of exercise. Further, Tirrell and Hart (1980) found that knowledge of the exercise regimen positively correlated with compliance with the walking regimen for 32 CABG surgical patients. However, similar to the present study, the weather was a significant barrier to compliance. The supportive-educative telephone program assisted participants in developing an exercise plan in spite of this barrier.

Given that the meaningfulness of the educational content affects learning (Cronbach, 1977; Falvo, 1985; Van Hoozer et al., 1987), educational content must be meaningful to the CABG surgical patient. In-hospital education programs may fail to deliver content addressing CABG surgical patients' unique,

primary concerns. During the home convalescent period, patients may be more interested in information related to following treatment regimens than in information related to the disease per se. This assertion is confirmed by the higher scores achieved by all participants in this study on the exercise subtest than the CAD subtest.

To further substantiate this view, Bille (1977) found that after hospital discharge many patients answered questions concerning anatomy and physiology incorrectly but correctly answered questions related to self-care and treatment; Coombs (1984) reported similar results. Steele and Ruzicki (1987), on the other hand, found that both experimental and control group subjects were least competent in answering questions on postdischarge activity progression after participation in an in-hospital patient education program. Overall, the literature indicates that information related to exercise is more readily accepted during the first 6 weeks after hospital discharge after initial patient concerns have been addressed.

Teaching recommended exercises is a central element of the cardiac rehabilitation program at the study hospital, with vast nursing and medical expertise and research studies in the area of exercise training and testing (Kappagoda & Greenwood, 1984). The program's emphasis on exercise training may have positively influenced the knowledge level of both groups. Stevens' (1985) study, conducted in the same cardiac rehabilitation department as the present study, supports this postulate.

The greater knowledge level of the experimental group participants than the control group participants demonstrates that information about exercise activities is more relevant when presented in the home convalescent period as opposed to presentation in the hospital. The persuasively argued premise that prominent concerns and information needs of hospitalized patients revolve around survival issues rather than life style changes (Rahe et al., 1975; Kinchla & Weiss, 1985; Marshall, 1985; Nicklin, 1986; Flynn & Frantz, 1987; Wenger, 1986; Steele & Ruzicki, 1987) is supported by this study. In this study, the higher knowledge level of the experimental than the control group can be explained by the individualized information provided by the CRNS and subsequent adjustments in the participants' walking programs considering their age, previous activity level, health state, and physical response to exercise.

Over half of the study participants lived in rural areas of the province with limited access to cardiac rehabilitation exercise programs. One can speculate that the telephone program was particularly important for providing the necessary exercise information to individuals unable to attend structured rehabilitation programs. The telephone program effectively provided information to a patient population which otherwise would not have received information about a progressive exercise plan. Finally, the program bridged a 6 week gap for those intending to join an organized exercise program after their 6 week surgical assessment.

Recommended Rest. Hypothesis 6 was supported given that the experimental group demonstrated a greater knowledge level about recommended rest than the control group, $t(72) = 8.92$, $p < .01$. The experimental group mean percent score was 94.6%; the control group, 70.5%, with standard deviations of 7.96 and 14.4, respectively. This result conflicts with Stevens' (1985) report of no significant group differences on the rest subtest.

The nursing and medical personnel in the study hospital provided CABG surgical patients with information about the type and amount of recommended rest during the early home convalescent period. The available literature on recovery from CABG surgery has remarked that fatigue, weakness, and sleeping problems are common. In Wilson-Barnett's (1981) study more than half of the subjects described sleep disturbances. Similarily, participants in the present study experienced both sleep disturbances and neurological changes such as confusion, memory lapses, and poor concentration. These events were interpreted as both threatening and inconvenient. This was particularly evident in the control group, and one can speculate that the high anxiety scores of this group, to be discussed shortly, influenced the low mean percent correct knowledge score attained. Importantly, group differences were largest on the rest subtest indicating particular effectiveness of the telephone program for enhancing knowledge about home convalescent rest activities.

Summary of Knowledge Levels Of The Study Sample

Participants receiving the supportive-educative telephone program demonstrated significantly greater knowledge levels than the control group on both the knowledge test as a whole and the specific subtests, namely, CAD, its related effects, and self-care measures, therapeutic diet, prescribed medications, recommended physical activity restrictions, recommended exercises, and recommended rest. Further, given that the predicted effect size of the program was .8 and the power of the statistical tests in this study was low (.47) due to the small sample size, the actual effect of the program was probably large rather than medium because a significant difference between groups was detected. It is unlikely that the results were due to chance.

Professionals have intuitively assumed that all patient education is valuable even though there is as yet little definitive research to support this assumption. The type of educational encounter incorporating different approaches and methodology may influence the amount learned. Moreover, the amount learned may be influenced by readiness for content, meaningfulness of the content, and anxiety.

Many educators contend that patients' readiness for content affects their ability to learn (Cronbach, 1977; Narrow, 1979; Redman, 1980; Webb, 1983). The time available for conducting educational programs both in and out of the hospital is not easily manipulated. Educational programs are often completed when staff are available, not necessarily when

the patient is receptive. Most program content is presented to all patients in the same sequential order. Therefore, due to time restrictions and program structure, education may be attempted prematurely or supplied too late to be meaningful for some individual patients.

Frasure-Smith and Prince (1985) found that although the majority of patients had been taught about their disease as part of usual hospital procedures, after patients returned home, little of this information had been retained well enough to help patients deal with their specific situations. Thus, from the nurses' perspective, teaching and providing reassurance by telephone to patients recovering at home constituted a major portion of their role. Yamada (1984) also found that only 2 CABG surgical patients specifically identified personal benefits, in preparation for discharge, from the in-hospital teaching program. Gerard and Peterson (1984) reported similar results for 31 MI patients -- few could recall having been taught in hospital by nurses.

Meyer and Latz (1979) found that cardiac surgical patients did not perceive the content of their teaching booklets as particularly meaningful or helpful in preparation for recovery at home. Rather, in the home convalescent period, an understanding of the type and severity of chest pain and specific recommendations about activity was perceived as more helpful. Meyer and Latz (1979) also found that after hospital discharge some patients remain unclear about the surgical procedure which had been performed in hospital. Finally,

Yamada (1984) found that patients' concerns at home were different than those presented in the cardiovascular literature. The professionals' concerns about discharged patients failed to materialize during Yamada's patient interviews. The kinds of problems that patients expressed were of a concrete nature (e.g., voice changes). The present study confirmed this finding and went a step further in addressing participants' concerns and learning needs in the home convalescent phase via a telephone program.

Brundage and Mackeracker (1980) have suggested that adults possess unique characteristics which affect how they should be taught. They believe teaching is effective only when it capitalizes on adults' past experience and focuses on the immediate present. Consistent with this premise, the supportive-educative telephone program focused on the participants' immediate needs while convalescing at home. Evidence from this study suggests that the supportive-educative telephone program, delivered to a sample of CABG surgical patients, is an effective means of providing patient education and counseling.

The current abbreviated hospital stay after CABG surgery has considerably limited the ability to provide the information and support patients need to prepare for convalescence at home; thus, teaching must be continued after discharge from the hospital. Of the many mediums available for patient education, the telephone is gaining in popularity (Nicklin, 1981), and more importantly -- effectiveness.

To date, the telephone has not been adequately explored as an adjunct or alternate method for continuation of patient education and counseling following hospital discharge.

Further, the telephone, as a mode for providing patient education and counseling has received relatively little attention in the research literature, despite the number of researchers recommending its implementation and rigorous evaluation (Bilodeau & Hackett, 1971; Granger, 1974; Owens et al., 1978; Stevens, 1985; Nicklin, 1986; Wenger et al., 1986). Patients can be innundated with a profusion of aids to education. A challenge to nurses is to select effective techniques for achieving educational goals without confusing or frustrating patients. Advantages of telephone teaching/counseling are suggested: (1) it saves time and money for the patient as well as the health care agency and staff; (2) health care appears more universally accessible when the patient knows that a teaching/counseling telephone program exists; and (3) patients who might be embarrassed asking a stupid or personal question may appreciate the relative anonymity of the telephone.

State Anxiety

The mean S-Anxiety score of the experimental group was 29.78 with a standard deviation of 7.72, and for the control group, 43.22 and 11.52, respectively. Hypothesis 7 was supported as the experimental group participants demonstrated lower S-Anxiety scores than the control group participants, $t = -5.89$, $p < .01$. Therefore, the supportive-educative

telephone program was effective in lowering the anxiety level of the experimental group participants.

Anxiety and timing of teaching have been postulated to affect patients' learning and retention (Hart & Frantz, 1977; Christopherson & Pfeiffer, 1980; White et al., 1980). Several researchers have found in-hospital cardiovascular patient education programs effective in reducing patient anxiety (Budan, 1983; Barborowicz et al., 1980; Toth, 1980). However, other researchers found education programs ineffective in reducing patient anxiety (Kubinec, 1982; Pozen et al., 1977; Christopherson & Pfeiffer, 1980; Raleigh & Odtohan, 1987). The effectiveness of the supportive-educative telephone program in lowering the participants' anxiety probably resulted from the combination of continuous supportive interaction with the CRNS, meaningful content presented at the most appropriate time, and a program tailored to meet the unique learning needs and individual concerns of each participant.

Additionally, as hypothesized, a negative correlation was found ($r = -.71$) between the 74 participants' level of anxiety and level of knowledge. When examined separately, both the experimental and the control group demonstrated a negative correlation between knowledge and anxiety levels although the negative correlation was of greater magnitude in the control group. Therefore, the telephone program was more effective in reducing the anxiety levels of some patients than others.

While the nursing research literature to date has focused a great deal of attention on how best to meet the learning

needs of patients, little consideration has been given to the anxiety which can accompany recovery at home. Given the inverse relationship between knowledge and anxiety found in this study, one has to question the merits of programs implemented by educators failing to identify and alleviate patient anxiety. Nor can it be assumed that all patients are anxious, given the large variance in the control group.

The hospital experience for a CABG surgical patient can be extremely anxiety provoking. Intense anxiety levels may significantly limit the amount learned (Budan, 1983; Spielberger et al., 1983). In addition, Hasser (1979) and others (Hijeck, 1984) have indicated that patients experience a letdown or loss of security upon leaving hospital even though they are eager to return home to a familiar routine and environment. Similarily, Yamada (1984) found that although CABG surgical patients were pleased to be home, the recovery process was not without its problems and anxieties. Frasure-Smith and Prince (1985) reported, in the telephone follow-up of 453 MI patients, that 60% of the subjects reported feelings of anxiety or depression in the home convalescent period. This may influence the amount and type of discharge information which might be learned from a typical in-hospital or outpatient education program.

Nurses must be aware of any preconceived notions about patients' ability to learn due to their age or educational background because the age of this study's participants bore no relationship to their knowledge level. On the other hand,

while the control group participants' knowledge level was not significantly related to their education level, the experimental group participants' knowledge level was significantly correlated with their education level. Given that, in general, fewer experimental group participants (n = 5) than control group participants (n = 11) had attained post-secondary education, evidently the telephone program was effective in conveying information in spite of this difference. The point here, is that, teaching and counseling must begin with an assessment of patients' unique needs.

Not only were the control group participants more anxious than the experimental group but also their response to this anxiety was more intense. Although all participants expressed concern with somatic symptoms, significantly more control group participants went to the emergency department and subsequently were rehospitalized. In all cases, anxiety or lack of information contributed to these hospital admissions. For example, 5 control group participants became anxious and were subsequently rehospitalized due to the inability to determine the probable cause of their chest pain; this concern was not identified by participants who received the supportive-educative telephone program. One can speculate that the CRNS, who provided specific information and allowed the patient to ventilate their concerns, was successful in preventing the participants from misinterpreting their symptoms and escalating their anxiety. An element of anxiety also contributed to 2 control group participants'

rehospitalization for shortness of breath.

Because the supportive-educative telephone program was in fact a combination of two interventions, namely, education and counseling, it is difficult to determine which of the two components was more beneficial to the participants' recovery. That is, during the home convalescent period, did the provision of information alleviate anxiety or did the provision of support enhance knowledge retention? It would appear that the two components were probably synergistic. Regardless, this study provides support and encouragement for the development and evaluation of telephone counseling and education programs delivered to a patient population which to date had not been researched in this manner. This study also challenges the effectiveness of traditional institution-oriented education programs, supports a move away from patterns of accountability dependent on a professional hierarchy, confirms the need for self-care resources within the community at large, and confirms the need to provide a bridge between in-hospital and outpatient cardiac rehabilitation education programs.

Implications and Recommendations For Nursing

The findings of this study have demonstrated the effectiveness of the supportive-educative telephone program, delivered to CABG surgical patients, during the initial 6 to 7 weeks of their home convalescent period. Experimental group participants attained greater levels of knowledge and displayed lower levels of anxiety than the control group. These findings suggest several implications, and subsequent, recommendations for nursing practice, administration, education, and research.

Nursing Practice

Today's cardiovascular nursing practice is in a state of rapid transition primarily because of the present medical and technological advances. In keeping pace with the technological changes, it is essential to conceptualize, synthesize, and categorize the knowledge explosion in cardiovascular nursing. This is best accomplished through research on clinical nursing problems. Cardiovascular nurses cannot continue to base their practice on past principles and unfounded myths. Practice based on routines, rituals, and unquestioned principles fails to respond to the changing needs of cardiovascular patients or the changing roles demanded of nurses.

A major implication for nursing practice resulting from this study is that current educational encounters and programs especially in the interim from hospital discharge to 6 weeks after discharge may not be providing CABG surgical patients with information or strategies needed to assist them with

self-care behaviors. It is naive to believe that providing CABG surgical patients with an extensive syllabus of what they ought to know is sufficient for the performance of self-care behaviors at home. Given the short hospital stay for the CABG surgical patient, hospital nurses cannot realistically expect to provide patients with the necessary information and skills required to implement recommended life style changes and appropriate self-care decisions. Providing too much information to hospitalized patients only overloads or confuses them. A benefit of research-based nursing practice is that CABG surgical patients receive current and relevant care, reflecting technological advancement of the health sciences. Nurses, during the supportive-educative phase, are in a strategic position to positively influence patients' self-care knowledge and decrease anxiety throughout the home convalescent period.

Patients are capable of learning the necessary self-care information during the initial 6 to 7 weeks after hospital discharge. The study described herein demonstrates one nurse's attempt to respond to the CABG surgical patients' educational and counseling needs during this time by evaluating the supportive-educative telephone program. The evidence provided by this study call into question the validity of the assumption that CABG surgical patients leave hospital equipped with the knowledge and skill to perform self-care at home.

The present study also may aid in distinquishing between

effective and ineffective nursing practices. Attempting to provide the CABG surgical patient with a vast amount of information in the short time between surgery and hospital discharge may be a frustrating exercise in futility. A more effective nursing practice might be to provide the hospitalized patient with limited, essential information, attending to their specific questions and concerns. The remaining information necessary to facilitate self-care behaviors might be more effectively and appropriately presented once the patient is recovering at home. As the problems and questions arise during this period of adjustment, important issues may be assessed and dealt with effectively by a CRNS. If teaching is to be effective it must meet the needs expressed by CABG surgical patients and fit with their perspective of health, illness, and recovery. Implementing educational and counseling encounters during the home convalescent period, a time when CABG surgical patients have had an opportunity to apply information and experience problems, would allow patients to discuss these issues, to ask questions, and to obtain the information necessary for effectively implementing self-care measures.

Moreover, to facilitate a smooth transition from hospital stay to the home environment, hospital nursing staff and a CRNS ought to collaborate with the appropriate support personnel in assessing, planning, implementing, and evaluating CABG surgical patient rehabilitation teaching and supportive counseling programs. Offering assistance to patients over time

is particularly important for those living a significant distance from the hospital; patients who often are unable to participate in an organized cardiac rehabilitation program.

Information alone is not sufficient in patient education programs. Because chronic illness management and life style changes involve affective as well as cognitive functions, nurses must deal with patients feelings and anxieties, given the significant barrier that anxiety can pose for patient learning. Facilitating discussion of emotional responses must be an integral component of any progam dealing with chronic illness management. An atmosphere of acceptance must exist where CABG surgical patients are supported and encouraged in their endeavors concerning behavior and life style changes. Through a telephone program, nurses could periodically assess the patient's knowledge and anxiety levels over time, and discuss patient concerns in an unhurried and calm manner.

Reports in the literature indicate that patients with complex treatment regimens demonstrate poor knowledge and compliance. Through a supportive-educative telephone program, nurses could offer these patients support and encouragement by providing immediate feedback and positive reinforcement. Nurses could pose problem-solving questions to patients who do not initiate questions and assess their ability to utilize the information for implementing life style changes.

Further, the patient's family ought to be included in the rehabilitative process considering the significant influence they may have on the patient's compliance with recommended

life style changes. Through a supportive-educative telephone program, the nurse could assess the patient's significant supportive relationships. If supportive relationships are lacking it may be necessary to increase the frequency of telephone contacts. Moreover, in the present study, many family members expressed knowledge deficits about the recovery process after CABG surgery. They expressed a need to discuss concerns with other families experiencing CABG surgery. Therefore, to meet the needs of family members, a teleconferencing network ought to be designed, implemented, and evaluated as a means to this end.

A number of advantages could be derived from incorporating the results of this study into practice for the patient, for the nurse, and for society. First, this study provides evidence for a gap in the delivery of nursing care to CABG surgical patients given the greater knowledge level of the experimental group than the control group. This is entirely understandable considering that hospital nurses have little opportunity to interact with patients after hospital discharge and, thus, cannot be expected to be cognizant of the patients' problems and concerns during the home convalescent period. However, by critiquing and utilizing the findings of this study in clinical practice, the nurse can gain insight into the patients' difficulties with the recovery period, focus on the patients' perspectives, and assess the feasibility of implementing such a program into practice.

This study is beneficial to the nursing profession by

contributing to the unique body of knowledge which is constantly being developed and advanced by its members. Testing existing nursing theories in practice and evaluating the quality of nursing services provided will assist in defining nurses' independent functions in the health care system. This must be accomplished through research focusing on clinical phenomena of importance to the recipients and providers of nursing care.

The complex health care delivery system of today requires a nursing model to provide direction toward goal unification and clarification for nursing CABG surgical patients. Nurses must seek more effective and efficient means of facilitating patient self-care. Moreover, the growing influence of patient-centered approaches to nursing care creates the need for a theoretically based nursing practice. Using Orem's self-care framework to guide nursing practice, the nurse can sort myth from fact and question past nursing practices. During the supportive-educative phase (Orem, 1985), nursing must facilitate patient self-care by supplying information, educating the CABG surgical patient both in the hospital and during the home convalescent period.

Phillips (1986) has eloquently stated that "the art of nursing is more than knowing what to do, it is also knowing why to do it, when to do it, and when not to do it" (p. 55). Historically, discharge teaching, by presenting the patient a syllabus of information, has been a major yet time consuming nursing function. However, today, nurses may feel victimized

by pressures of the health care economic scene; CABG surgical patients no longer have the option to remain in the acute care setting until they are completely well. This pressure must be perceived as an opportunity to implement more effective and efficient nursing care and discharge planning.

Both as a concept and a function, discharge teaching is necessary for high quality patient care and sound patient management practices. But discharge teaching is not sufficient; implementation of a innovative telephone program, delivered to CABG surgical patients in their homes, ought to be considered to bridge the transition from hospital to resumption of a normal life style. Nurses must be assured that the services they provide in hospital are worthy of time, money, and energy, and patients must be assured of receiving nursing care that is appropriate in type, timing, and amount. The goal of the telephone program is to ensure that CABG surgical patients entering the acute care institution have a plan for their continuing self-care needs when they leave the hospital.

Society, at large, may benefit from the implementation of a supportive-educative telephone program. Given the tremendous increases in hospital costs, the number of study participants who lived in rural areas, and the rehospitalization rate of the control group participants, the supportive-educative telephone program has the potential for being cost effective by preventing unnecessary readmissions and extended patient travel time. The CRNS was able to

effectively identify high-risk patients and concentrate on prevention, and based on their risk factors, a more aggressive individualized treatment plan. The telephone program is one means of providing nursing services for the most overall good at the least overall cost for both the patient and the health care system.

This study demonstrates that the nurse is an appropriate primary contact person allowing the patient entry and universal access to the health care system. The CRNS who implemented the supportive-educative telephone program demonstrated tremendous knowledge and skill in dealing with the questions, concerns, and problems of CABG surgical patients. This reflects years of cardiovascular nursing experience and sound decision-making skills. In addition to considerable clinical expertise, the CRNS provided information and counseling to CABG surgical patients, relying on exceptional communication skills and a solid foundation in the principles of adult teaching and learning. It is recommended that, should this study be replicated with similar patient populations, the nurse implementing such a program must possess at a minimum, these qualifications. In light of the recent emphasis on the expanded role of the nurse, further research is needed to support the premise that the nurse is the appropriate and cost-effective member of the health care team to maintain continued access for the CABG surgical patient to the health care system in the post-hospital discharge period.

Clinical nursing research has the continuing problem of a dearth of valid and reliable measurement tools. The knowledge questionnaire developed by Horn and Swain (1977) was chosen because the operational definitions and topics selected for evaluating patient knowledge were consistent with the theoretical structures of Orem's (1985) self-care framework. Moreover, the knowledge questionnaire, unlike many cardiovascular knowledge measurement tools described in the nursing literature, had undergone considerable reliability and validity testing. Although the knowledge questionnaire is not without limitations, the present study demonstrates the utility of an instrument developed and tested by a nurse, to measure a theoretical nursing concept. Additionally, the knowledge questionnaire could be an effective guide for continued assessment and teaching of the CABG surgical patient; however, further refinement of the scoring procedure is required.

A final implication for nursing practice was revealed while conducting this study. The research project provided visibility and accessibility of clinical nursing research to staff nurses and, thus, an opportunity to narrow the existing gap between nursing research and nursing practice. Staff nurses were encouraged to ask questions about conducting nursing research and were utilized as special research assistants to facilitate an understanding of the relevance of research to the enhancement of nursing practice. Further, staff conferences are presently being organized to determine

how the results of this study may be incorporated into nursing practice.

This study supports the recent creation of a unique nursing position in the study hospital: a clinical cardiovascular patient educator. However, this position differs from the patient educator roles described in the literature. Specifically, a goal of this position is to provide an unbroken continum of patient education and counseling from several weeks prior to surgery to the 6 week postoperative assessment. The nurse provides both direct and indirect educational encounters, visiting the patients preoperatively as well as postoperatively in hospital. The patient is then contacted regularly by telephone in the home convalescent period. Although, as yet, this recent program has not been scientifically evaluated, the combination of continuous, individualized direct contact teaching and counseling both before and after surgery, and indirect contact via a telephone program in the home convalescent period may prove more effective than either one alone. This remains to be tested. Evaluation ought to be a vital component of any newly instituted nursing position on which to base cost-effective administrative decisions.

Nursing Administration

In the midst of economic constraints of health services to trim operating costs and promote efficiency, attempts to implement cardiovascular patient programs lacking research-based evidence for effectiveness are unlikely to be

well received by nurse administrators. This study demonstrates the effectiveness of a telephone program for facilitating learning, decreasing anxiety, and perhaps preventing rehospitalization of CABG surgical patients. From a purely economic viewpoint, it makes sense to implement a program such as the supportive-educative telephone program because it allows one nurse with cardiovascular expertise to provide continuing education and counseling to a large number of CABG surgical patients.

The CRNS also provided an extension to nursing care and education provided by the in-hospital staff by reinforcing and providing additional information to the CABG surgical patient. Nursing literature contains few references to consultation as a nursing role, however, based on the results of this study, a CRNS or nurse consultant may be a fruitful adjunct to the teaching conducted by in-hospital nurses. Implementation of the supportive-educative telephone program is recommended for providing continued education and support to CABG surgical patients after hospital discharge. Further, the program should be located in a quiet area near a cardiovascular nursing ward or in a cardiac rehabilitation department on a 24 hour a day basis.

Nurse administrators in the study hospital enthusiastically supported this study and have developed policies for the conduct and utilization of nursing research. Although final approval for this study was granted by the nursing administration of the study hospital, informal

discussions with cardiovascular staff nurses during the conduct of this study revealed limited attempts by nurses to incorporate research results into practice. Therefore, administrative support for the development and attendance of ward research committees during the nurses' working day could facilitate utilization of nursing research findings into practice for the benefit of the profession and the cardiovascular surgical patients.

Resources for the conduct and utilization of research such as written material, ward meetings, inservices, conferences, formal and informal discussions, and faculty members from university institutions should be made available to all staff members. Reviewing job descriptions, performance evaluations, and peer review criteria to ensure that research activities are considered part of the legitimate role of a nurse-clinician in the institution are examples of how functional supports for research utilization can be created. However, with current staffing patterns and patient workloads, few nurses have time to consider these recommendations. Nurses should be encouraged to develop researchable questions based on problems encountered in their practice. Nurse administrators in the study hospital must facilitate the conduct of clinical nursing research and assist nurses to recognize the vital role of research for improving the quality of patient care.

Nursing Education

The results of this study have exciting implications for educating nursing students in the care and education of CABG surgical patients. Patient education has long been recognized as an important cardiovascular nursing function and pressures to evaluate patient education are increasing apace with rapid expansion of the field itself. However, barriers interfering with patient education exist in the acute care setting; barriers which can result in frustration and disillusionment for the nursing staff and students and an inability of the patient to retain the information provided. Students in the cardiovascular clinical setting might use the results of this study as the basis for care plans and clinical conferences. Encouraging students to find cardiovascular research reports, such as this, that support their ideas and to identify the strengths and weaknesses of the research base they are using are essential for developing a research-based profession.

This study indicates that CABG surgical patients forget information received in hospital during the weeks following hospital discharge. That is, the control group who did not receive the supportive-educative telephone program displayed significantly less knowledge of self-care practices as well as significantly higher anxiety levels than the experimental group. Further, the significantly higher knowledge levels and lower anxiety levels of the experimental group patients supports the premise that patients are capable of learning in the early home convalescent period. Therefore, the nursing

student caring for CABG surgical patients must be aware of the barriers to learning inherent in an acute care setting.

The amount of teaching required prior to CABG surgical patients' hospital discharge can rarely be accomplished in the available time. Moreover, given the long-range effects of anesthesia and analgesics, which alter the patient's attention span and level of fatigue, perhaps many aspects of self-care information would be more effectively retained in the early home convalescent period delivered by a CRNS. Community health nursing students could utilize these insights to assess, teach and counsel CABG surgical patients via the telephone or if necessary, during home visits.

Merely giving patients information provides no guarantee that the patient has learned the information. To be effective, information provided to the CABG surgical patient must be relevant and comprehensible. Information must be delivered when the patient is ready and motivated to learn, and it must be presented in an environment that is conducive to learning. The nurse educator must, therefore, assist the student to identify the information CABG surgical patients need prior to leaving hospital and to consider patients' anxiety level, perceptions, motivations, and learner readiness. The student must coordinate and evaluate appropriate teaching strategies for each phase of recovery after CABG surgery. By anticipating the patients who might be at risk in the home convalescent phase, greater attention could be provided from the student or the CRNS in the

outpatient setting. If necessary, referrals to other health care professionals, such as home care nurses, could be arranged.

Nursing students must understand that patient education involves more than simply repeating directions to patients or handing out printed material. It is a process involving the precise clinical nursing skills of data gathering, individualized instructions, support, and evaluation and follow-up of the patient's success in implementing the treatment regimen and life style changes. CABG surgical patient errors in interpreting instructions from health professionals are distressingly common. These errors can occur when health care providers fail to: carefully instruct patients about their treatment in the appropriate degree of detail, seek their questions and reactions, and determine whether they understand the instructions given.

Patient education is a patient right as well as a professional responsibility. Nursing students and educators must understand that patient education must be effectively implemented and rigorously evaluated to gain the greatest benefit for the patient and the nursing profession alike. The supportive-educative telephone program ought to be considered as an effective means of correcting patient misunderstandings and monitoring patient progress during recovery from CABG surgery.

Nursing Research

This study demonstrates that the supportive-educative telephone program was an effective means of increasing the knowledge level and decreasing the anxiety level of 37 CABG surgical patients who received the program compared to 37 CABG surgical patients who did not receive the program during the first 6 to 7 weeks after hospital discharge. Further, the rate of rehospitalization was significantly lower in the experimental group than the control group. However, the following research questions merit attention:

1. What is the CABG surgical patients' level of knowledge and level of anxiety 2 weeks prior to surgery and 6 months and a year after surgery?
2. What self-care behaviors are performed 6 weeks, 6 months, and a year after hospital discharge?
3. What is the effect of a family education program on the knowledge level and anxiety level of significant family members of the CABG surgical patient?
4. How does the family members' level of knowledge and anxiety impact on the knowledge and anxiety level of the CABG surgical patient?
5. What is the feasibility of implementing a teleconferencing family education-counseling program?
6. What is the effect of a supportive-educative telephone program on the knowledge and anxiety levels of other patient populations?
7. How cost effective is the supportive-educative telephone

program?

8. What is the effect of a clinical patient educator providing not only a supportive-educative telephone program but also direct continuous education and counseling to the CABG surgical patient from the time surgery is proposed to 6 weeks after hospital discharge?

9. Does the addition of direct teaching encounters in the home convalescent period have advantages over the telephone program alone?

10. What factors affect the CABG surgical patients' level of knowledge and level of anxiety?

It is recommended that this study be replicated with a larger sample size including those patients who have undergone more than one CABG operation. The patient is ready to learn when faced with concerns requiring immediate answers. This study demonstrates that patients can continue to learn about CAD, its effects, and the recommended medical regimen and self-care behaviors from information provided by a CRNS via the telephone following hospital discharge. However, a multivariant, longitudinal experiment designed to assess the knowledge level, anxiety level, and other relevant rehabilitative variables of CABG surgical patients over an extended time period is recommended. It may be that the program is sufficiently effective for short-term patient knowledge retention but requires continued reinforcement for long-term beneficial effects.

Moreover, a broadened evaluative approach to the

supportive-educative telephone program should include determination of the impact of the program on patient behavior. Patient educators ought to look to techniques other than, or in addition, to knowledge tests, to determine the learning and self-care behaviors resulting from participation in the telephone program. Observing the participant actually performing the task would provide more valid and reliable evidence than participant self-report. Further research is also required to determine factors which inhibit or facilitate the practice of self-care behaviors.

An unexpected finding of this study was the considerable number of questions and concerns expressed by the family members of the CABG surgical patient. Family members frequently expressed concern over being ill equipped with the required knowledge to care for their loved ones at home, causing considerable distress. A number of family members suggested implementation of a telephone program exclusively for significant family members. Spouses often felt comforted that other wives or husbands had similar concerns. The only contact many family members had with other families was in the waiting room outside the cardiovascular intensive care unit. In this waiting room many anxieties, questions, and eventually telephone numbers were exchanged. Based on this serendipitous finding, it is recommended that a study be designed to implement and evaluate a teleconference network to teach and counsel family members in the early home convalescent period. In this vein, a support group is presently being organized for

spouses of CABG surgical patients at the study hospital.

Finally, the lack of valid and reliable evaluative instruments is a major deficit of cardiovascular patient education. The CABG surgical patients' knowledge levels were assessed with a valid and reliable knowledge questionnaire compatible with the conceptual framework upon which this study was based. Although it is the most appropriate tool available to date, further instrumental research is needed to refine the scoring procedure of this tool. Moreover, teaching areas such as sexual activity after surgery and stress management ought to be incorporated into the tool, and the convergent and discriminant construct validity assessed and reported. Ideally, one would measure knowledge using several different methods to keep potential errors related to method from clouding the evaluation.

There is a dirth of knowledge tests with unknown validity and reliability in the cardiovascular nursing literature. These paper and pencil tools must be assessed for validity and reliability; concurrent validity with Horn and Swain's knowledge questionnaire could then be assessed. One Canadian researcher has conducted considerable work in the development and validation of knowledge tests for CABG surgical patients (Coombs, 1984). Determination of the validity and reliability of instruments prior to their use is essential if valid and reliable results are desired (MacPhail, 1983).

Summary

The purpose of this study was to evaluate a supportive-educative telephone program implemented during the first 6 to 7 weeks of the home convalescent period and designed to increase self-care knowledge and decrease anxiety of CABG surgical patients. The participant's knowledge was assessed in the areas of: (a) coronary artery disease, its effects, and related self-care measures; (b) therapeutic diet; (c) prescribed medications; (d) recommended physical activity restrictions; (e) recommended exercises; and (f) recommended rest. The participant's state anxiety level was measured by a paper and pencil tool developed by Spielberger et al. (1983). Of the accessible population of CABG surgical patients, between September 1986 and March 1987, 74 participants were randomly assigned to either an experimental or a control group. The experimental group received 4 to 6 supportive-educative telephone calls from a CRNS, the purpose of which was to provide self-care education in six selected teaching areas as well as to provide supportive counseling. Both groups completed the S-Anxiety inventory and the interview administered knowledge questionnaire upon return to the cardiovascular surgeon for the 6 week assessment.

The supportive-educative telephone program increased knowledge and decreased anxiety of CABG surgical patients during the early home convalescent period. Further, the participants' knowledge level correlated inversely with their anxiety level. From these findings, several implications and

recommendations for nursing practice, nursing administration, nursing education, and nursing research have been generated.

Nurses have a long history in patient education. Although most nurses have long accepted and acknowledged their part in educating patients, their role in the process has not been clearly defined, particularly the degree of independence within which they should function. As health care providers, professional nurses are responsible and accountable to patients for the quality of nursing care patients receive. This responsibility and accountability includes teaching the patient relevant facts about specific self-care needs and supporting appropriate behavior modification.

Patient education takes place in a variety of settings, for a variety of reasons, and under a variety of circumstances. Regardless of the purpose or method of patient education, the nursing professional must have a framework for organizing and conducting educational encounters. Further, patient education is effective only if it reaches the goal it was designed to accomplish.

Evaluation is essential to patient education. Conducting patient education without rigorous evaluation is as inefficient as giving the patient information without first assessing patient learning needs and priorities. If existing teaching programs are ineffective then new innovative strategies must be incorporated and evaluated to assist the patient in reaching the goals of patient education.

Dealing with only the knowledge aspects of patient

education is a futile effort. Without a firm understanding of other factors affecting patient education, such as anxiety, the nurse's effort in relaying knowledge alone can end in frustration for both patient and nurse. The present study is but one example of what ought to be a continued effort by the nursing profession to scientifically evaluate both existing and novel patient education and counseling programs and the factors which facilitate or hinder patient self-care behaviors during recovery from CABG surgery.

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APPENDICES

Appendix A

Knowledge of Health Deviation, Its Effects And Related Self-Care Measures

Time:
Start_____ Date_____

Finish_____ Subject Code Number_____

Purpose of Component

1. To determine patient's ability to describe accurately his or her own health problems, related symptoms, anatomy, and physiology in technical or non-technical terms.

2. To determine patient's ability to identify appropriate measures to control and/or decrease health problems after discharge.

3. To determine patient's ability to identify appropriate modifications in post-discharge daily routine necessitated by health problem.

4. To determine patient's ability to identify correctly situations related to particular health problems in which professional health care assistance would be needed.

Observer judgment:
1. Correct
2. Mixed - correct and incorrect
3. Don't know or irrelevant
4. Incorrect

Appendix A
Health Deviation Knowledge
(Coronary Artery Disease)

Introduction

"ONE ASPECT OF PATIENT CARE IS TO PREPARE PEOPLE TO CARE FOR THEMSELVES ONCE THEY GO HOME. TO HELP THEM UNDERSTAND AND HANDLE PROBLEMS WHICH CAN OCCUR, THESE NEXT QUESTIONS ARE TO HELP US FIND OUT ABOUT PEOPLE'S ABILITY TO CARE FOR THEMSELVES AFTER HOSPITAL DISCHARGE."

"First I would like to ask you about your health problems."

What health problem brought you to the hospital 6 weeks ago before your surgery?

Correct responses ( ) Don't know ( )

If patient does not know what brought him/her to hospital or why surgery was required, pose the question "Were you told that you had any problems that required surgery?"

Follow-up Questions for Diagnosis

1. Now I would like to ask you about your blocked coronary arteries.

1.a What part(s) of your body was affected by the blocked coronary arteries?

b. How do coronary artery blockages affect the way your heart works?

c. What symptoms might indicate to you that more severe coronary artery obstruction was occurring?
(Must give 3 of possible 10 symptoms to be considered correct.)

Observer Judgment: 1a 1 2 3 4
1b 1 2 3 4
1c 1 2 3 4

Follow-Up Questions for Symptoms

2. Now I'd like to ask you about chest pain.

2.a Can you tell me how occluded coronary arteries produces chest pain?

Observer Judgment: 1 2 3 4

Appendix A

Follow-up Questions for Causal Factors

3. Now I'd like to ask you about coronary artery disease.

3.a What parts of your body are affected by coronary artery disease?

b.How does coronary artery disease cause blocked coronary arteries?

Observer judgment: 3a 1 2 3 4
3b 1 2 3 4

3.c.How is coronary artery bypass graft surgery supposed to help your heart?

Observer Judgment: 1 2 3 4

Questions about Self-Care After Discharge

4. How have you modified your daily routine because of the coronary artery bypass graft surgery?

Observer Judgment: 1 2 3 4

5. What situations, if any, related to your cardiac bypass surgery have/would prompt you to consult your physician, nurse or other health care professional?

Observer Judgment: 1 2 3 4

6. What, if anything, could/did you do to prevent angina?

Observer Judgment: 1 2 3 4

7. If angina occurs/occurred, what might/did you do to decrease or control it?

Observer Judgment: 1 2 3 4

Appendix B

Therapeutic Diet

Time:
Start_____

Date_____

Finish_____

Subject Code Number_____

Purpose of Component

1. To determine patient's knowledge of therapeutic diet.

2. To ascertain patient's knowledge of relationship between the therapeutic diet and health.

3. To determine patient's knowledge of meal preparations and/or daily routine adjustments needed to maintain the therapeutic diet.

1. Were changes recommended in your usual eating habits while you were in hospital?

Yes__ No__ Dont't know___ N.A.___

If yes, proceed to #2. If no or don't know, probe to find out if this is because the recommended changes are the same as they had previously been doing in their usual eating patterns. If this is the case note this on the sheet and mark N.A. - go to next section of interview.

2. How do these nutritional changes affect your health or relate to your disease/condition?

If the answer is "Feel better" ask "How"?

Observer Judgment: 1 2 3 4

3. Are there any foods which you should limit or not eat?

Yes___ No___ Don't know___

(go to #4) (go to #5)

4. What kinds of foods should you limit or not eat?

Observer Judgment: 1 2 3 4

Appendix B

5. Did following these recommended changes make any difference in the way you, or the person who does the shopping, shop for groceries?

Fat and Na restriction: Probe for type of foods to buy.

Yes__ No__ Don't know__
(go to #6) If no, ask "Why not?" Try to determine if the reason for this is because they have always shopped wisely. If so, this would constitute a correct answer. If they don't know, go to #7.

6. What do they or you have to do differently?

Observer Judgment: 1 2 3 4

7. Are there special things that had to be done when cooking in order to follow this nutritional change?

Na restriction: Probe for use of salt

Fat restriction: Probe for cooking methods

Yes__ No__ Don't know__

(go to #8) If no, as "Why not?" Try to determine if the family's cooking methods are already sound for Na and Fat restrictions. If so, this constitutes a correct answer. If they don't know go to #9.

8. What did you or the person doing the cooking have to do?

Observer Judgment: 1 2 3 4

9. How did you manage to follow these recommended nutritional changes at work?

If retired or unemployed - Mark N.A.

Observer Judgment: 1 2 3 4

10. How did you handle following these recommended nutritional changes on social occasions?

Observer Judgment: 1 2 3 4

11. Do you know if there are any printed materials about the recommended nutritional changes?

Yes__ No__ Don't know__

Appendix B

12. Do you know where to get written information about the recommended nutritional changes?

Yes____ Where?_____ No____
Knows of at least one place_____

13. Do you know if there are classes you can go to to learn more about these nutritional eating habits?

Yes__ No___ Don't know___

14. If you needed help planning or following your diet after you went home, to what group, agency or professional did/would you go for help in your community?

___ Doesn't know ___Knows of at least one place/person

Appendix C

Medication Knowledge

Time:
Start_____ Date_____

Finish_____ Subject Code Number_____

Purpose of the Component

To ascertain patient's knowledge of medications including name, reasons for, dose, action, side effects, treatment of side effects, and independent actions in preparation and administration of medications.

Observer Judgment:

1. Correct
2. Mixed - correct and incorrect
3. Don't know or irrelevant
4. Incorrect

1. What are the names of the medications you have been taking since hospital discharge?

The patient should either be able to state the names of all the medications or provide the observer with the names in writing. Either the generic or trade name may be given. If the patient responds with a description of what the drug does, e.g. "blood thinner", "heart pills", the observer should pursue and ask, "Can you tell me the name of your heart pills?"

Observer Judgment: 1 2 3 4

Able to state names - circle 1
Has them written down and accessible - circle 2
Knows 1 or 2 but not all the names - circle 2

2. I'm now going to ask you questions about_____
(name of medication)
Use both trade and generic names.

3. How long have you been on this medication?

Appendix C

4. What is this medicine supposed to do for you? or What are the expected effects of this medicine? How does this medicine relate to your disease/condition?

A very general answer is not acceptable, e.g. "feel better" or "help my heart". The patient should know the expected effects of the medication, e.g. strengthen heart, relieve inflammation, or improve circulation.

Observer Judgment: 1 2 3 4

5. How much of this medication are you supposed to take?

This, in most cases, should be in specific amounts, e.g. 0.1 mg. If the patient responds "one pill a day", this is not acceptable. Exceptions might be necessary for medications such as Digoxin which are perscribed "once a day". Attempt to find out specific dose. Dosages are on the biographical data sheet.

Observer Judgment: 1 2 3 4

6. At what time(s) do you take it?

The answer should include specific times and frequency, e.g. once a day in the early morning. "With meals" is not specific enough; find out the times of the meals. "Four times a day" is not specific enough, find out times.

Observer Judgment: 1 2 3 4

7. Are there any situations when you should not take this medication?

Yes___ No___ Don't know____
(go to #8) (go to #9)

8. Tell me about them.

These questions are to establish if the patient knows for which medications he/she should modify the dose and/or time taken. E.g. "I take one digoxin unless I notice my heart rate is less than 60 beats per minute, then I will not take the pill and I will call my doctor". "If my blood pressure is___, I take one of my ___". "If I notice bleeding, I will not take my Coumadin until I call my doctor".
Observer Judgment: 1 2 3 4

9. Are there special instructions about food or fluids because you are taking this medicine?
Yes__ No__ Don't know___
(go to #10) (go to #11)

Appendix C

10. What are they?

Observer Judgment: 1 2 3 4

11. Are there activities you should avoid while taking this medicine?

Yes__ No__ Don't know___
(go to #12) (go to #13)

12. What are they?

Observer Judgment: 1 2 3 4

13. Are there medicines you should avoid while taking this medicine?

Yes__ No__ Don't know___
(go to #14) (go to #15)

14. What are they?

Observer Judgment: 1 2 3 4

15. Are there side effects this medicine might have?

Yes__ No__ Don't know__?
(go to #16) (go to #17)

16. What are they?

Observer Judgment: 1 2 3 4

17. Before you take this medicine are there things you are supposed to do first?

Yes__ No__ Don't know__
(go to #18) (go to #19)

18. Tell me what you need to do.

Observer Judgment: 1 2 3 4

19. How did you fit taking this medicine into your daily routine?

Observer Judgment: 1 2 3 4

Appendix C

20. Are there things that would/did make you not take or not want to take this medicine?

Yes__ No__ Don't know___
(go to #21)

21. What ways have you thought of to take care of (cope with) that?

Observer Judgment: 1 2 3 4

Appendix D

Recommended Physical Activity Restrictions

Time:
Start_____ Date_____

Finish_____ Subject Code Number_____

Purpose of Component

To determine the patient's knowledge of recommended physical activity restrictions.

1. Were restrictions in any of the following physical activities recommended for you after you left the hospital?

Check the activities for which the patient gives a "yes" response:

___operating a motor vehicle
___lifting heavy objects
___climbing stairs
___crossing your legs
___returning to work (or housework)
___don't know
___none
___other (describe)
_____
_____

Observer Judgment: 1 2 3 4

2. What do these activity restrictions do for your heart?

Observer Judgment: 1 2 3 4

Appendix D

3. How do these activity restrictions accomplish that? (How do they help your heart?)

Observer Judgment: 1 2 3 4

4. What things might happen to your heart if you don't restrict these activities?

Observer Judgment: 1 2 3 4

5. How long a time will you need to follow these restrictions on your activities?

Observer Judgment: 1 2 3 4

6. Were there times or circumstances when it was inconvenient for you to restrict these activities as recommended?

Yes__ No__ Don't know__
(go to #7) (go to #8) (Mark #7 N.A.)

7. How did you plan to handle these circumstances and still be able to restrict your activities?

Record each situation and the patient's solution

Observer Judgment:
___NA
___Has plan for each situation
___Has no plan or only partial one.

8. Do you know if there are any printed materials about your activity restrictions?

Yes__ No___ Don't know___

Appendix E

Recommended Exercises

Time:
Start_____ Date_____

Finish_____ Subject Code Number_____

Purpose of Component

To determine the patient's knowledge of recommended exercises.

Observer Judgment:

1. Correct
2. Mixed - correct and incorrect
3. Don't know or irrelevant
4. Incorrect

1. What exercises were recommended for you after you left the hospital?

Observer Judgment: 1 2 3 4

2. What do these exercises do for your body?

Observer Judgment: 1 2 3 4

3. How often were you supposed to do these exercises?

Observer Judgment: 1 2 3 4

4. At what times of the day were you supposed to/did you do these exercises?

Observer Judgment: 1 2 3 4

Appendix E

5. Were there times when it was better for you not to do these exercises or do these exercises differently than the way recommended?

Observer Judgment: 1 2 3 4

6. Tell me about those situations.

Observer Judgment: 1 2 3 4

7. Were/are there times or circumstances when it was/would be difficult or inconvenient for you to do these exercises as recommended?

Yes___ No___ Don't know__
(go to #8) (go to #9)

8. How did/do you plan to handle these circumstances and still be able to do your exercises?

Record each situation and the patient's solution.

Observer Judgment
___NA
___Had plan for each situation
___Had no plan or only partial one.

9. Do you know if there are any printed materials about your recommended exercises?

Yes___ No__ Don't know___

Appendix F

Knowledge of Recommended Rest

Time:
Start_____ Date_____

Finish_____ Subject Code Number_____

Purpose of Component

To determine the patient's knowledge of recommended rest activities.

Observer Judgment:

1. Correct
2. Mixed - correct and incorrect
3. Don't know or irrelevant
4. Incorrect

1. Were rest activities recommended for you after you left the hospital?

Observer Judgment: 1 2 3 4

2. What type of rest activities were you supposed to do?

Observer Judgment: 1 2 3 4

3. What did these restful activities do for your heart?

Observer Judgment: 1 2 3 4

4. How does the recommended rest accomplish that? (How does it help your heart?)

Observer Judgment: 1 2 3 4

5. What things might happen to your heart if you don't/didn't do these restful activities as recommended?

Observer Judgment: 1 2 3 4

Appendix F

6. Were there times or circumstances when it was difficult or inconvenient for you to do these restful activities as recommended?

Yes___ No___ Don't know___
(go to #7) (Mark #7 as N.A.)

7. How did you plan to handle these circumstances and still be able to get your rest?

Record each situation and the patient's solution.

Observer Judgment

___NA
___Has plan for each situation
___Has no plan or only partial one.

Appendix G

Self-Evaluation Questionnaire

STAI Form Y-1

Name _____ Date _____ S ____

Age _____ Sex: M ____ F ____ T ____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel *right* now, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	NOT AT ALL	SOMEWHAT	MODERATELY SO	VERY MUCH SO
1. I feel calm	①	②	③	④
2. I feel secure	①	②	③	④
3. I am tense	①	②	③	④
4. I feel strained	①	②	③	④
5. I feel at ease	①	②	③	④
6. I feel upset	①	②	③	④
7. I am presently worrying over possible misfortunes	①	②	③	④
8. I feel satisfied	①	②	③	④
9. I feel frightened	①	②	③	④
10. I feel comfortable	①	②	③	④
11. I feel self-confident	①	②	③	④
12. I feel nervous	①	②	③	④
13. I am jittery	①	②	③	④
14. I feel indecisive	①	②	③	④
15. I am relaxed	①	②	③	④
16. I feel content	①	②	③	④
17. I am worried	①	②	③	④
18. I feel confused	①	②	③	④
19. I feel steady	①	②	③	④
20. I feel pleasant	①	②	③	④

Appendix H

Guidelines For Use Of Knowledge Scales

Observer Judgment:
1. Correct
2. Mixed (both correct and incorrect)
3. Don't know or irrelevant
4. Incorrect

The scales are arranged in order to evaluate the presence of knowledge that would be helpful for successfully managing at home or of knowledge that would be harmful. Knowledge about health problems that is correct and complete is most helpful. A mixture of correct and incorrect knowledge, lack of knowledge, or irrelevant knowledge is placed midway between as to being helpful or harmful to successfully management of health problems after discharge. Incorrect knowledge is judged to be most harmful.

In using the questionnaire where these scales appear, the interviewer should record the patient's response as given for each question of the appropriate series. After the interview, the interviewer should then review the responses and circle the scale number below the response that best describes the response. This judgment should be guided by the examples of correct responses in the manual and by the biographical information. When several responses are being scored on one scale, the group of responses should be evaluated as a whole.

Appendix H

Definitions

Correct. The patient's responses are on the list of correct responses in the observer manual or the observer judges that the patient's statements are accurate and show knowledge that will be helpful in managing the problem at home. The patient's responses are still considered correct if irrelevant statements are made in addition to correct responses. To be correct, the patient's responses must include all the responses on the correct response lists for that question. The patient's response is considered correct if it is accurate and helpful in managing self-care.

Mixed. The patient gives both correct and incorrect information in his response to the question.

Doesn't know. The patient makes a statement such as "I don't know", "The nurse told me but I can't remember", or "I can't think of anything".

Irrelevant. The response does not address the question or the response describes an action that differs from recommended therapy and may be ineffective, but ~~is~~ harmless and does not interfere with therapy, e.g., "Just hope for the best". (When irrelevant statements are made, the observer should probe to obtain a relevant response.)

Incorrect. The patient's responses are not on the list of correct responses and the observer judges them to be incorrect i.e., to show misinformation that would either harm the patient or interfere with therapy. The patient's responses are still considered incorrect if irrelevant statements are made in addition to the incorrect responses.

Appendix H

Evaluating Patient Responses

The chart below summarizes the guidelines for evaluating the patient's responses of the 4 item knowledge scales.

Point on Scale	Defining Characteristics	May also Include	Must Not Include
Correct	1) At least one correct statement is made. 2) All items from correct response list are included.	Irrelevant statements	Incorrect statements
Mixed	1) At least one correct statement is made and one or more items from correct response list are omitted. 2) At least one correct and incorrect statement is made	Irrelevant statements	
Irrelevant or Don't know	1) The patient makes a statement such as "I don't know" 2) No relevant response (correct or incorrect) can be obtained by probing.		Correct statements. Incorrect statements (If correct or incorrect statements are made, they are used to evaluate the response instead of irrelevant or "don't know" statements.)
Incorrect	At least one incorrect statement is made.	Irrelevant statements	Correct statements

Appendix I

Correct Responses

Health Deviation		Correct Responses
1 a	Part of body affected by by occluded coronary arteries	The heart wall and the heart muscle are affected. Decreased circulating blood and oxygen to heart muscle causes pain.
1 b	Effect of occluded arteries	The pumping action is impaired because of lack of oxygen.
1 c	MI Symptoms	3 symptoms must be given: - pain (chest, arms, neck, jaws, shoulder, throat), or "indigestion" symptoms, - sweating or perspiration - moist clammy skin - shortness of breath - weakness - fatigue - nausea or vomiting - irregular heart beat - pale or grey skin color.
2 a	Cause of chest pain	Pain is felt because a blockage in the vessel prevents the heart muscle from getting enough oxygen.
3 a	Parts of body affected by CAD	The arteries to the heart.
3 b	Cause of MI	"When a coronary artery or vessel is blocked, the part of the muscle deprived of blood is damaged".
3 c	Effect of CABG	The obstruction was removed or bypassed allowing the blood to flow to the portion of the heart where flow was previously restricted.

4 Modification of routine	The intent is to determine the patient's ability to identify appropriate modifications in postdischarge daily routine necessitated by health problems and surgery. Examples: not go to work, take an afternoon nap, be less active, etc. *Three answers are required for a correct response: alternate easy and difficult tasks, allow time to rest, stop when tired, take a rest period after meals, get lots of sleep, avoid lifting, pushing, and pulling heavy objects, avoid crowds of people or people who upset you, won't be able to go to work, take medications, follow diet, observe wound for healing/infection, avoid persons with upper respiratory infections.
5 Situations in which to call physician and other health care professionals.	The intent is to determine patient's ability to identify correctly situations in which he should obtain professional help after discharge. Symptoms of complications, questions or problems with therapy at home, or follow-up and advice regarding a chronic illness and CABG are all appropriate responses. Examples are: pain, infection in incisions, no relief of pain or dyspnea with therapy or medication, advice on travel, regular check-ups. *One answer is required for a correct response. - Heavy pressure or squeezing

pain in chest. Pain in shoulder, arm, neck, jaw which is not relieved by nitroglycerine, increased shortness of breath, fainting, very slow or rapid heart rate,
- Infection or pain in incisions, increased temperature,
- questions on problems with medication,
- questions on problems regarding activity or diet.

6 Prevention of angina

The intent is to determine patient's ability to identify appropriate preventive self-care measures related to a potential health problem after discharge from hospital. Examples: get adequate rest, avoid stress and over-excitement, stop smoking, monitor for infection.
*Three answers are required for a correct response.
- stop cigarette smoking,
- follow exercise schedule as recommended,
- take medications,
- get extra rest and sleep,
- assess for infection,
- avoid activities causing chest pain,
- avoid driving motor vehicles until Doctor advises.

7 Control of angina

The intent is to determine patient's ability to identify appropriate self-care measures for controlling or reducing a potential health problem which may occur after discharge. Sit down, rest and take nitroglycerine.
*One answer is required for a correct response.
Avoid lifting heavy objects, take medications, slow down activities, avoid activities which cause chest pain.

Therapeutic Diet

2. Affect on health or related to coronary artery disease.	The intent is to determine the patient's ability to state the health benefits to be gained from the recommended diet. The example given should be specific. If the response is vague or non-specific, probe for further information. Examples or correct responses follow.
Diet	
Sodium restricted	The salt is restricted so I don't retain fluid and my heart doesn't have to work too hard.
Fat restricted	To decrease the cholesterol or fats in my blood so hopefully plaque does not develop and obstruct my blood vessels. Help prevent a heart attack.
Calorie restricted	To lose weight so my heart doesn't have to work hard providing blood to excess fat tissue.
3. Should foods be limited or restricted?	The correct answer is "yes".
4. Type of foods to limit or restrict.	*Must give at least three examples to be considered correct.
Sodium restriction:	Pretzels, potato chips, salted popcorn, packaged luncheon meats, sauerkraut, salt, soya sauce, boullion cubes, canned, salted, or smoked meats, bacon, balogna, frankfurters, ham, sausage, canned vegetables.
Fat restriction:	Fried foods, fatty foods.
Caloric restriction:	Simple sugars - cakes, cookies, soda pop, candy, pies.

5-6 Differences in shopping	The intent of the question is to determine the patient's knowledge about the label-reading, buying special products, eliminating other usually bought products. Examples of correct responses follow.
Sodium restriction:	Read labels on canned foods and prepare meats. Observing sodium restriction (200 mg or less) would entail buying low salt bread, unsalted butter, unsalted soups, and canned vegetables.
Fat restriction:	Purchase low saturated fat foods like corn, and safflower oils, corn oils, margarine, low-fat milk. Buy only lean meat. Purchase more chicken and fish.
Sugar restriction:	Read labels for added sugars.
7-8 Differences in cooking	This is to determine whether the patient has a plan of action when altered cooking techniques are required. Response should be specific such as, "I will broil more foods"; "I will use all egg whites and no egg yolks in baking"; "I will let people add salt at the table rather than add it when cooking". Examples of correct responses follow.
Sodium, fat, and sugar restriction:	Don't use salt in cooking. Don't add salt at the table. Don't fry foods. Use less sugar including honey. Bake less "sweets".

9 Manage nutritional changes at work.	This and the next question are to determine if potential problem times for following the diet have been thought through. Examples are: "I will bring my lunch"; "I will carry a list of foods allowed". Unacceptable answers would be: "I won't eat lunch", "I won't follow the diet".
10 Manage nutritional changes on social occasions.	Acceptable responses are: "I will tell the hostess ahead of time about my diet"; "I'll ask how the foods were prepared"; "I'll ask what is in combination dishes"; "I'll eat only those things I know are allowed". "I'll go off the diet for one meal" is an unacceptable response unless the patient indicates he/she will eat only moderate amounts of the restricted foods.
11-12 Written information.	All diets have some printed/written materials relating to them. The question is to determine if the patient knows at least one source to obtain material. If the patients have a diet booklet with them, mark "Yes". Booklets supplied by dietician are: Nutritional Guidelines for a Healthy Heart, Canada Food Guides and 3 -5 Gm Sodium Booklet. Patients do not have to name the booklet but must indicate they can get them from the hospital, the dietician, or a community health nurse.
13 Diet classes.	The correct response is yes. Diet classes are held every Tuesday on Station 3G4 at the study hospital at 13:30 hours.
14. Information sources available.	The answer is yes. Examples: nutritionist, local hospital, Heart Foundation, and CRNS.

Medications Asasantine (Dipyridamole-ASA) 4 Purpose:	Inhibitor of platelet adhesion and aggregation. "To prevent blood clots". To prevent occlusion of saphenous vein CABGs.
5 Dosage:	Take 1 capsule three times a day; dosage will depend on physician's orders.
6 Time taken:	Should reflect times that will maintain a constant blood level.
7-8 When not to take:	Must not take concurrently with "over the counter" cold medications especially those containing ASA.
9-10 Special food or fluid instructions:	Capsules may be taken with meals. Do not take with alcohol.
11-12 Restricted activities:	Should not play violent contact sports.
13-14 Restricted medications:	Caution recommended with: cough and cold medications, ASA, anticoagulants, hypoglycemic drugs, corticosteroids, indomethacin, spironolactone.
15-16 Side effects:	Hypotension, headaches, stomach ache, heartburn, dizziness, constipation, bloody stool, nausea, vomiting, flushing, sweating and thirst.
17-18 Pre-medication activities:	No
19 Daily routine adjustments:	Plan should be practical and specific. "I'll put them in a special container each day" or "I'll carry them with me when I go out for the evening".
20-21 Not wanting to take medications:	Plan should be practical and specific.

Apresoline (Hydralazine HCL)

4 Purpose:	For management of essential hypertension.
5 Dosage:	Adjust dosage according to the patient's individual blood pressure response.
6 Time taken:	50 mg four times daily.
7-8 When not to take:	No
9-10 Special food or fluid instructions:	No
11-12 Restricted activities:	No
13-14 Restricted medicines:	No
15-16 Side effects:	Headache, palpitations, tachycardia, anorexia, nausea, vomiting, diarrhea, angina, nasal congestion and flushing.
17-18 Pre-medication activities:	No
19 Daily routine adjustments:	Plan should be practical and specific. "I'll put them in a special container each day".
20-21 Not wanting to take medications:	Taste, texture, or not wanting to take medications are factors that may influence taking the medication. Plan should be specific and practical.

Captopril (Capoten)

4 Purpose:	For hypertensive patients who on multidrug regimens have either failed to respond well or developed side effects. For CHF, to decrease systemic vascular resistance, pulmonary vascular resistance, increase cardiac output and exercise tolerance time.
5 Dosage:	12.5 - 25 mg three times daily. Dosage must be individualized.
6 Time taken:	Should reflect times that will maintain a constant blood level.
7-8 When not to take:	If blood pressure is low or dizziness occurs.
9-10 Special food or fluid instructions:	Captopril should be taken 1 hour before meals.
11-12 Restricted activities:	No
13-14 Restricted medicines:	Should not take any medication without consulting physician.
15-16 Side effects:	Urinary frequency, rash, hypotension, chest pain, palpitations, loss of taste perception, gastric irritation and abdominal pain.
17-18 Pre-medication activities:	No
19 Daily routine adjustments:	Plan should be practical and specific. "I'll put them in a special container each day" or "I'll carry them with me when I go out for the evening".
20-21 Not wanting to take medications:	Taste, texture or not wanting to take medications are factors that may influence taking medications. Plan should be practical and specific.

Digoxin (Lanoxin)	
4 Purpose:	Increases contractility of the heart and thus cardiac output in congestive heart failure. For atrial fibrillation - slows conduction velocity in the atrioventricular node.
5 Dosage:	Check data sheet. Digitalization must be individualized. The usual daily oral maintenance dose is 0.125 - 0.50 mg.
6 Time taken:	Any time of the day acceptable - multiple doses equally spaced.
7-8 When not to take:	Yes - if heart rate is below 60 beats per minute or if experiencing nausea, vomiting anorexia or diarrhea. Caution if potassium depleted.
9-10 Special food or fluid instructions:	Eat foods high in potassium - bananas, orange juice, broccoli.
11-12 Restricted activities:	No
13-14 Restricted medications:	No
15-16 Side effects:	Headache, weakness, apathy, visual disturbances, anorexia, nausea, vomiting, diarrhea, decreased pulse, palpitations, photophobia.
17-18 Pre-medication activities:	Take pulse for one minute.
19 Daily routine adjustment:	Plan should be practical and specific. "I'll put them in a special container each day." "I'll carry them with me when I go out". "I'll take one every morning ".
20-21 Not wanting to take medications:	Taste, texture, or not wanting to take medications are factors that may influence taking the medication. Plan for coping with these should be practical and specific.

Diltiazem HCL (Cardizem)	
4 Purpose:	Reduction of myocardial oxygen demand. For management of angina.
5 Dosage:	Dosage must be adjusted to each patient's needs. 240 mg a day given in 4 equally divided doses.
6 Time taken:	Before meals and at bedtime - equally spaced.
7-8 When not to take:	No
9-10 Special food or fluid instructions:	No
11-12 Restricted activities:	No
13-14 Restricted medicines:	Diltiazam and digitalis may have an additive effect in prolonging A-V conduction.
15-16 Side effects:	Nausea, swelling, arrhythmia, headache, fatigue, pounding heart, hypotension, drowsiness, nervousness, heartburn, constipation, photosensitivity, thirst.
17-18 Pre-medication activities:	No
19 Daily routine adjustment:	Plan should be practical and specific. "I'll put them in a special container each day". "I'll carry them with me when I go out".
20-21 Not wanting to take medications:	Taste, texture, or not wanting to take medications are factors that may influence taking the medication. Plan for coping with these should be practical and specific.

Entrophen (ASA)

4 Purpose:	Platelet aggregation inhibitor - affects platelet function for the life of the platelet.
5 Dosage:	See patient data sheet - 325 - 650 mg
6 Time taken:	See patient data sheet.
7-8 When not to take:	In presence of manifestations of bleeding tendencies.
9-10 Special food or fluid instructions:	No
11-12 Restricted activities:	No
13-14 Restricted medications:	Should not take concurrently with oral anticoagulants.
15-16 Side effects:	Nausea, vomiting, diarrhea, gastrointestinal bleeding, tinnitus, hearing loss, drowsiness, sweating, thirst.
17-18 Pre-medication activities:	No
19 Daily routine adjustments:	Plan should be practical and specific. "I'll put them in a special container or place each day". "I'll carry them with me when I go out".
20-21 Not wanting to take medication:	Taste, texture, or not wanting to take medications are factors that may influence taking the medications. Plan for coping should be practical and specific.

Nitroglycerin

4 Purpose:	Chest pain, angina
5 Dosage:	1 - 3 tablets as necessary is considered a correct response. Dosage in mg is not necessary.
6 Time taken:	Whenever having chest pain or before activities that may produce chest pain, such as sexual intercourse or walking.
7-8 When not to take:	If blood pressure is too low, i.e., feeling faint or dizzy. If more than three tablets have already been taken within the last 5-6 minutes.
9-10 Special food or fluid instructions:	No
11-12 Restricted activities:	Avoid activities of all types until pain has gone away.
13-14 Restricted medicines:	No
15-16 Side effects:	Yes, at least one of the following: headache, dizziness, flushing, blackouts or fainting, fast heart rate.
17-18 Pre-medication activities:	Stop and rest or sit down before taking tablet if having chest pain.
19 Daily routine adjustments:	Carry tablets at all times. Keep covered in dark bottle. Check for expiry data on bottle.
20-21 Not wanting to take medication:	May cause headache or dizziness. Plan for coping should be practical and specific, i.e., take ASA with tablets, sit or lie down prior to taking medication or "Will continue to take them and hope that the symptoms will eventually go away".

Persantine (Dipyridamole)	
4 Purpose:	Long-term treatment of a variety of clinical conditions caused by decreased coronary flow. Improves exercise tolerance as well as lessen nitroglycerin requirements. Potential ability to improve collateral circulation in the myocardium.
5 Dosage:	Check data sheet - 75 mg three times a day.
6 Time taken:	Take at least one hour before meals. Equally spaced - should reflect times that will maintain blood levels.
7-8 When not to take:	No
9-10 Special food or fluid instructions:	Mild occasional gastric distress can be avoided by administration with a glass of milk.
11-12 Restricted activities:	No
13-14 Restricted medicines:	No
15-16 Side effects:	Occasionally headache, dizziness, nausea, flushing, syncope or weakness and skin rash.
17-18 Pre-medication activities:	No
19 Daily routine adjustments:	Plan should be practical and specific. "I'll put them in a special container or place each day". "I'll carry them with me when I go out".
20-21 Not wanting to take medication:	Taste, texture or not wanting to take medications are factors that may influence taking the medications. Plan for coping should be practical and specific.

Questran (Cholestyramine Resin)	
4 Purpose:	As adjunctive therapy to diet and exercise for the reduction of cholesterol in patients with primary hypercholesterolemia; potentially reducing risks of CAD and MI.
5 Dosage:	Individualized: Up to 160 mg daily in divided doses. Optimal maintenance dosages are 100 mg a day or less in divided doses.
6 Time taken:	Times should be equally spaced.
7-8 When not to take:	No
9-10 Special food or fluid instructions:	Should not be taken in its dry form. Mix powder with water, other fluids or highly fluid soups before ingesting.
11-12 Restricted activities:	No
13-14 Restricted medicines:	May bind with other drugs; take other drugs at least 1 hour before or 4 to 6 hours after this medication to avoid impeding their absorption.
15-16 Side effects:	Constipation, abdominal discomfort, flatulence, nausea, vomiting, diarrhea, heart burn, rectal bleeding, muscle and joint pain.
17-18 Pre-medication activities:	No
19 Daily routine adjustment:	Plan should be practical and specific. "I'll put them in a special container each day". "I'll carry them with me when I go out".
20-21 Not wanting to take medications:	Taste, texture, or not wanting to take medications are factors that may influence taking the medications. Plan for coping should be practical and specific.

Physical Activity Restrictions 1 Activity restrictions:	Yes - restrictions have been recommended in all of the following activities.
2 Effect on heart:	All items listed cause the heart to increase its work. By eliminating or gradually returning to these activities the heart can rest and heal.
3 How do they help the heart?	The intent of the question is to determine the patient's knowledge of the desired effects of the activity restrictions. The responses should be specific rather than "makes me feel better". Probe when necessary. The harder the heart works, the more oxygen it needs. Decreasing the work of the heart keeps the need for oxygen within the limits of what can be supplied by the blood vessels. Decreasing the work of the heart gives the coronary artery bypasses time to heal.
4 Things that might happen if activities not restricted:	May prolong healing or could cause damage to the heart wall. May experience pain or re-occlusion.
5 Time of restrictions:	6-8 weeks for most patients. Some activities may be restricted for up to several months, such as lifting heavy objects, until the sternum has time to heal.
6 Problems carrying out recommended restrictions:	The intent is to determine circumstances which may make it difficult to carry out activity restrictions. Examples: must return to work, must drive a car, has small children to carry, must do own housework. Plan for coping should be specific and practical.
7 Printed materials:	Yes - booklets received preoperatively: Moving Right Along and Home Sweet Home. Patient does not have to state the title of the booklets.

Recommended Exercises

1 Recommended exercises:	Walking exercises and whole body exercises.
2 Effect of exercise on body:	The intent of the question is to determine the patient's knowledge of the desired effects of the exercises. The responses should be specific rather than "help my back" or "make me feel better". Probe when necessary.
3 Frequency of exercises:	Daily for the first two weeks, gradually increasing duration and frequency.
4 Times to do exercises:	Walking - prior to meals and not during extremely hot or cold weather. Perhaps prior to lunch and mid afternoon in winter or late afternoon or evening in summer.
5-6 Avoiding exercises:	Yes - "If I am having chest pain or shortness of breath". "If I have a temperature or any type of infection". "If I do not feel well". "If it is too hot or too cold outside I may have to either wait for it to cool off if it is too hot or to walk inside if it is too cold outside".
7-8 Problems doing exercises:	Try to determine potential problems in carrying out exercises - observer judgment will be required to determine if answers are reasonable for that person.
9 Printed material:	Yes - Preoperative teaching booklet.

Recommended Rest

1-2 Recommended rest activities:	Yes - naps, rest. Responses can be general - "Just rest frequently" to specific "I must lie down for 30 minutes after each meal" or "After I do any walking or stair climbing I must sit and rest a few minutes".
3 Effect on heart:	Allows heart bypasses to heal.
4 How does it help heart?	Heart does not have to work so hard when resting. Resting after meals may reduce angina by reducing the amount of oxygen needed in the leg muscles and allowing it to go to the stomach to help digest food.
5 What might happen if restful activities are not followed?	Heart, sternum, and leg incision will take longer to heal. May experience angina or re-occlusion of vessels.
6-7 Circumstances making it difficult to do recommended activities:	The intent is to determine circumstances which may make it difficult to carry out recommended rest activities. Examples: must return to work, noisy home environment, does not like to sit still or lie down. Observer judgment will be required to determine whether or not the patient has a plan to handle difficult with following the recommended rest activity.

Appendix J

Biographical Data Sheet

Subject Code Number_____ Age (D.O.B.)_____

Address_____ Sex_____

Telephone_____ Marital Status_____

Date of CABG_____ Discharge Date_____

Number of Vessels Bypassed_____

Occupation_____

Education Level (See code)_____

Discharge Information

Diet_____

Other Pertinent Discharge Information:

Stress Test Results:_____

Patient's knowledge of stress test results: Yes__ No__

Prior Participation in a Cardiac Rehabilitation Program:

Yes__ No__

Prescribed Medications:

Code	Years of Formal Education
6	17 years plus
5	13 to 16 years
4	11 to 12 years
3	9 to 10 years
2	6 to 8 years
1	< 6 years

Appendix K

UNIVERSITY OF ALBERTA FACULTY OF NURSING
INFORMED CONSENT FORM

PROJECT TITLE: A Supportive/Educative Telephone Program: Impact On Knowledge and Anxiety After Coronary Artery Bypass Graft Surgery.

INVESTIGATOR: Theresa M. Beckie, R.N., B.Sc.N., MN Candidate

Purpose of the study: The purpose of this study is to investigate the use of a telephone program as a method of increasing the level of patients' knowledge about caring for themselves during the first 6-7 weeks after coronary artery bypass graft surgery. It is expected that the results of this study will provide nurses with a better understanding of how to help patients cope with recovering from surgery at home.

Consent: This is to certify that I,_____ consent to participate in the study outlined above. I understand that I may or may not be contacted by telephone. I give my permission to be interviewed, by the investigator, about my feelings and knowledge about my heart surgery when I return to my surgeon for a check-up in 6-7 weeks.

I UNDERSTAND that:

1. the interview and telephone calls will be tape recorded,
2. all information, including that obtained from my hospital chart pertinent to the study, will be held by the investigator, Ms. Beckie, in a locked cabinet, for 5 years after which time it will be destroyed. No one other than the investigator will have access to this information.
3. I have been provided with the telephone numbers of various health care people whom I may call should I have any questions or concerns. If I have any further questions regarding the study, I can contact Ms. Beckie at 432-4036
4. my name will not appear on any documents or reports,
5. each interview will not take more than 60 minutes,
6. I am free to withdraw my consent and terminate participation at any time without affecting my medical or nursing care,
7. I may not benefit directly from participating in the study, which it is hoped will contribute to a greater understanding of the nursing needs of patients, and,
8. there are no costs related to this study.

I HAVE BEEN GIVEN THE OPPORTUNITY TO ASK WHATEVER QUESTIONS I DESIRE AND ALL SUCH QUESTIONS HAVE BEEN ANSWERED TO MY SATISFACTION.

I ACKNOWLEDGE RECEIVING A COPY OF THIS CONSENT FORM.

_____ _____

(signature) (Date)

Appendix L

CABG Patient Call-Back Form

Name:_____ Date:_____

Date of surgery:_____ Time:_____

Discharge date:_____ Doctor:_____

Patient problem or question:

_____

_____

_____

_____

_____

Nursing solution:

_____

_____

_____

_____

Other important information:

_____

_____

_____

Appendix M

Patient Telephone Call Form

Problem or question:

Who did you call?

What advice were you given?

What was your reaction to this advice? Were you satisfied with the advice?